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The IRON AGE

IN TWO SECTIONS—SECTION ONE

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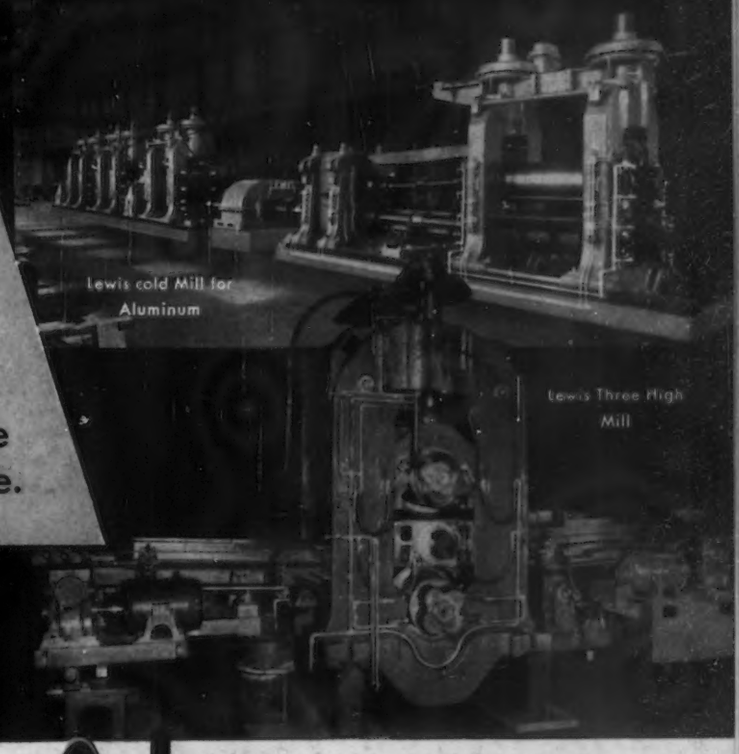

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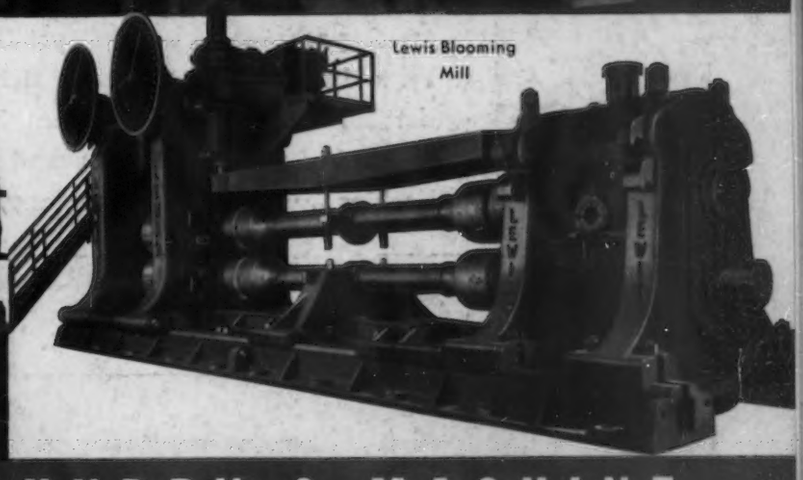

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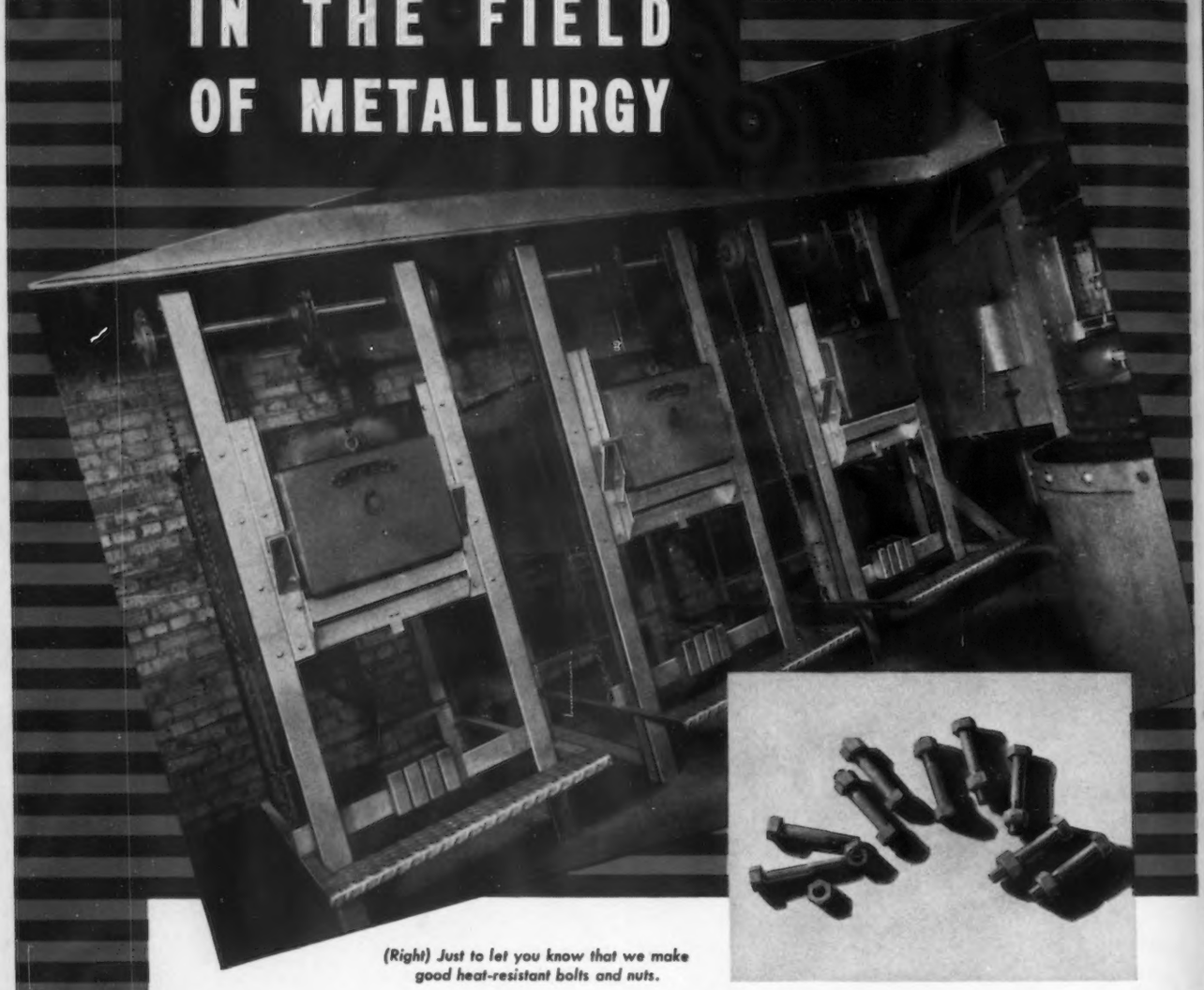

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The necessity of revising alloy steel specifications has made Hoskins Electric Furnaces particularly useful in metallurgical laboratories. Here are a few of several Hoskins small box furnaces used by a steel producer, to establish heat-treating practice on new alloys. The furnaces are built to stand the hard-going, up to 2000° F., that this day demands. The Chromel elements are extremely durable and easy to get at. Hoskins Furnaces are compactly built to conserve space. They are made in several sizes, and are described in Catalog 58. . . . Hoskins Manufacturing Company, Detroit, Michigan.

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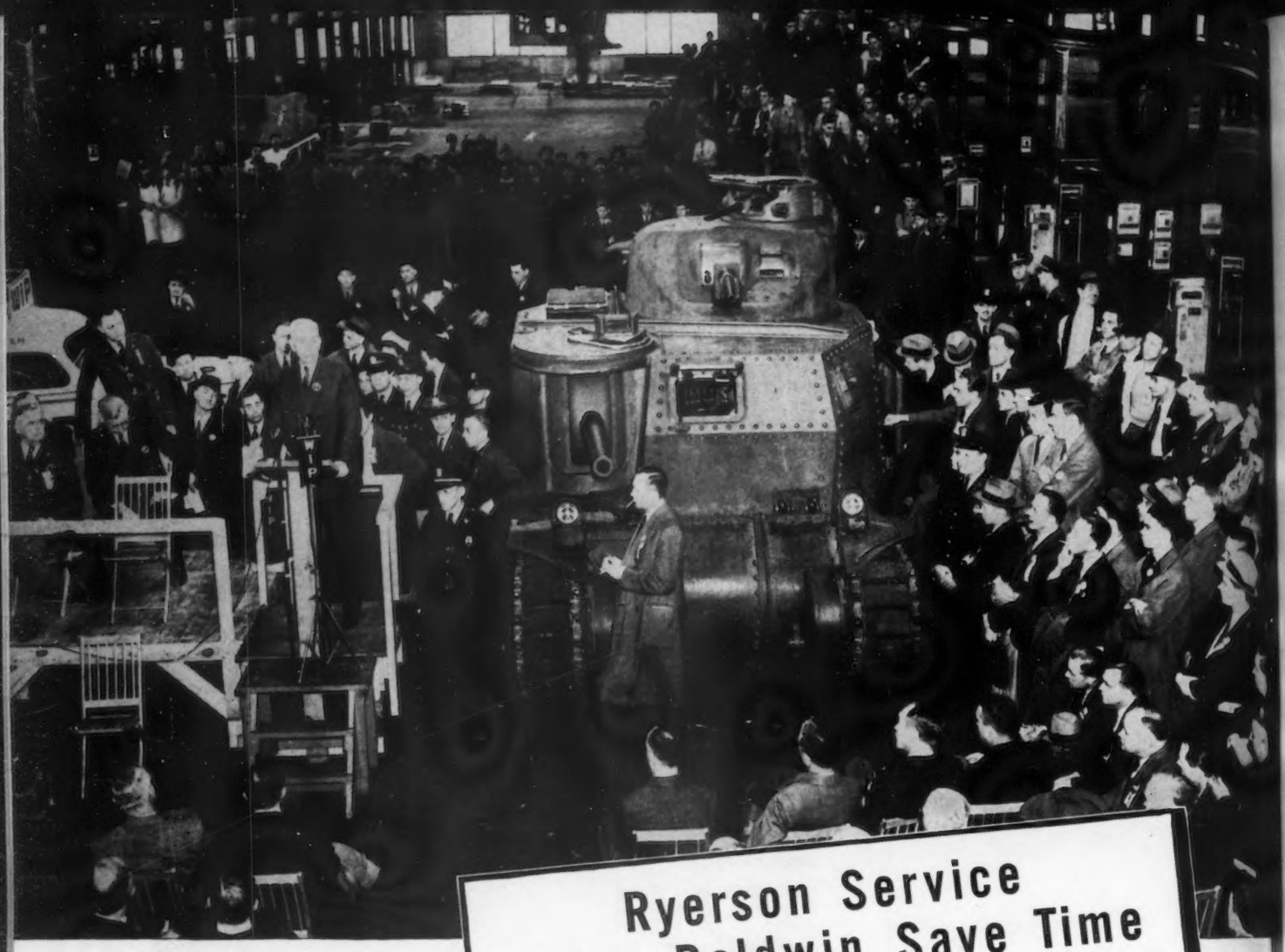

Mr Charles Brinley, President of the Baldwin Locomotive Works speaking at ceremonies when Baldwin's first M-3 tank was turned over to the Army.

Ryerson Service Helps Baldwin Save Time on Tank Schedule

● Baldwin needed steel *immediately* for a model tank to be constructed quickly as a guide to future production. *Speed* was the important factor, so Baldwin turned to Ryerson stocks for immediate shipment of the necessary steel. Ryerson alloy and carbon steels were shipped from stock the same day permitting work to begin at once.

Through this quick cooperation and the help of many other suppliers, Baldwin was able to beat the official schedule. This illustration is typical of the service Ryerson is rendering daily to manufacturers working on the National Defense Program.

Thousands of emergency calls have cut down our large stocks of steel, however, we are still serving thousands of customers in accordance with the OPM plan and believe we will be able to continue this service even if on a restricted basis, for the duration of our national emergency.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Detroit, Cincinnati, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

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THE IRON AGE

JANUARY 29, 1942

ESTABLISHED 1855

Tough Guys Without Strings

WHAT America needs most today in positions of public importance, are "tough guys" who know their business and who are given full power to run it.

You cannot manage a nation's war economy on the basis of a debating society, and committee management falls into this category. Nor can you do the job by appointing a puppet head or front man who has strings on him that are pulled by various groups or persons behind the scenes.

We have apparently come to that conclusion in connection with production and purchases as evidenced by the appointment of Donald Nelson as our supreme authority on these matters, accountable only to the President, and to the people of the United States.

It was a long step in the right direction, even if a delayed one, to replace the previous multi, mixed and indefinite lines of authority that tangled and tardied these functions by a single, simple and straight transmission line between Washington and industry.

Now that this has been done for purchase and production, the next thing is to do it for prices. As a matter of fact, this should have been done first because how you can control purchase and production without controlling prices is beyond comprehension.

The price administrator should have as full and as definite authority in his field as does Mr. Nelson in purchase and production. There should be no strings on him except the one leading to the White House and even that one should not be pulled very often.

I hope that Leon Henderson will get this job and that Congress will see to it that the job has no strings to it. I believe that Henderson is the best qualified man in the country to be our price boss.

This statement may have more weight when coming from one who has not hesitated in the past to express criticism regarding some of his actions and statements. However, during the past hectic months in which he has done such a remarkable job as "price minister without portfolio," what he has been able to accomplish without legal power has convinced me that he has well earned the job and has learned how to handle it.

Henderson undoubtedly is our best posted man on price history and on price theory. And his two recent years of post graduate work with all sorts of industry and all sorts of people have added the vitally essential element of practicality. He knows that price control must be shaped to help and not hinder our goal of "all-out" production.

Henderson is also a "tough guy" with a thick skin. But without these qualifications, he would not have lasted 10 minutes in the free-for-all arena in which he has been battling.

Industry has nothing to fear from a tough guy who knows his business. It could have much to fear from a compromiser who doesn't.

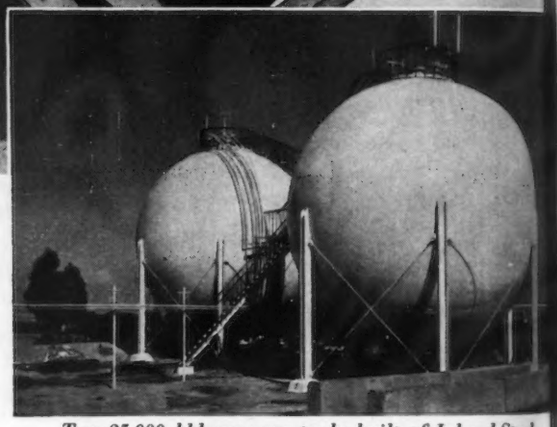
J. H. Van Deventer

NOT ALL TANKS
Will Cross Battlefields

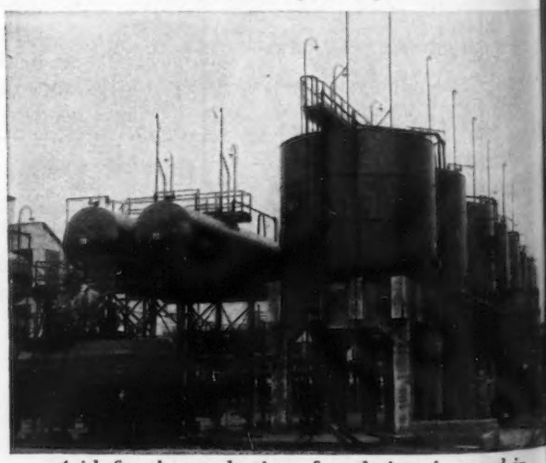
Combat tanks are, of course, a vital necessity for modern warfare. But they are not the only tanks. There are others—tanks which will never cross a battlefield, nor be featured in the headlines, or in picture magazines. These tanks are also vital to America's war program.

Filled with gasoline or oil at our off-shore bases, carrying the water supply high above ground at army camps, bearing important chemical solutions at scores of new defense plants—thousands of these tanks are playing their nonspectacular but essential part in our country's great emergency.

For their construction, Inland is regularly producing large tonnages of plates and other steel products. Just as for bomber plants—and ships—and shells—and countless other war requirements, Inland is bending every effort to deliver steel for these tanks when and where it is needed. Inland has but one job now—producing steel, steel and more steel to help win the war.



Two 25,000-bbl. pressure tanks built of Inland Steel in service at a powder plant.



Acid for the production of explosives is stored in these tanks at an Army Ordnance Works. Inland Steel was used for their construction.

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Spot Welding Aluminum At Lockheed

By HARRY L. CHILES
Spot Welding Engineer, Lockheed Aircraft Corp.

. . . Spot welding is being applied more and more to stressed members of airframes. Concurrent improvements in equipment and techniques have resulted in consistent gains in output of welded assemblies. What has been accomplished along these lines at Lockheed, particularly with Sciaky stored energy welders, is detailed by the author.

DURING the past three years, the rapidly increasing demands for greater production in the aircraft industry have given great impetus to the development of equipment for spot welding aluminum alloys. Spot welding machines have been improved and developed so rapidly that the machines available today are far superior to those which could be purchased a year ago, while machines purchased three years ago are comparatively unsatisfactory for spot welding aluminum alloys over 0.040 in. in thickness.

Prior to 1940, with a few exceptions, the use of spot welding in aluminum alloys was limited to nonstructural parts such as map cases, air ducts, switch boxes, cover plates and other similar parts. Secondary structures such as engine cowling, nacelle cowling, doors and window frames were also spot welded. Today, there can be added to this list floor supports, wing ribs, removable panels and stabilizer leading edges, most of which are primary stressed structures.

In July, 1939, a new type of spot welder was installed in Los Angeles for demonstration to the various aircraft manufacturers. This machine which was at that time manufactured in Paris, France, differed in many respects from the conventional single-phase welders which at that time were the only type of equipment manufactured in the United States for spot welding aluminum alloys. The most important features of this particular spot welder are as follows:

(1) The "stored energy" principle of operation.

(2) The use of direct current for welding.

(3) The variable pressure cycle.

This stored energy type of spot welder has probably done more to permit the widespread use of spot welding in the aircraft industry than any other one factor. These welders operate from a three-phase, a.c. supply, through a three-phase mercury-arc type tube rectifier. This energy is stored as magnetic energy in the welding transformer-reactor. When the energy has reached a preset value a contactor opens the primary d.c. circuit, inducing a very high transient current discharge through the secondary or welding circuit.

The 40-kw. spot welder, which welds aluminum alloys up to and including two sheets of 0.081 in. thickness, draws a maximum current of 75 amp. from a 440-volt three-phase power supply. Single-phase a.c. spot welders in the Lock-

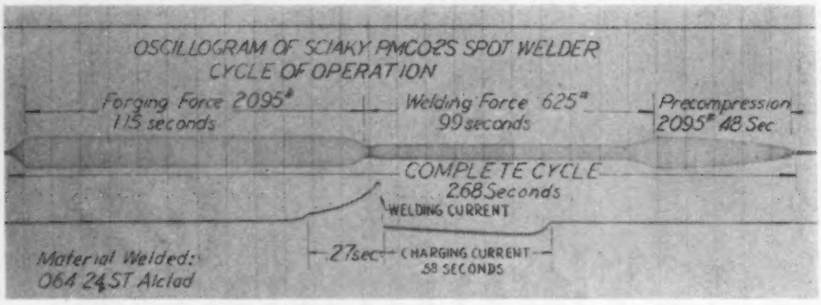

FIG. 1—Oscillogram showing current and pressure cycle of a Sciaky PMCO-2S stored energy type spot welder. The material welded is 0.064 in. 24ST alclad.

heed shop having about the same secondary area and capable of welding the same material draw a maximum of about 2000 amp. from a 440-volt single-phase supply. These single-phase welders have a nominal rating of 250 kva.; actually the maximum demand is 1000 kva. If the 16 40-kw. (stored energy) welders which Lockheed has in operation now were replaced by single-phase welders, the maximum demand on the power supply would be 23,350 kva., as compared with the present maximum demand of 7990 kva. The present welding power supply would not handle this increase in load and the necessary changes would be very expensive. The power systems supplying many of the major aircraft factories and practically all the sub-contractors could not possibly handle a single-phase load of this size.

The introduction of the reactor stored energy machines in this country also greatly stimulated the development of stored energy welders that operate on the condenser-discharge principle.

The pressure mechanism of this welder is so designed that either a constant or variable pressure cycle may be used. The pressure system contains two cylinders and pistons; the lower smaller piston is connected directly to the upper electrode holder and the second larger piston is "floating," that is, it is not fastened rigidly to the electrode holder. Its force is transmitted to the electrode holder by the piston rod pressing on the upper side of the lower piston. By means of two solenoid operated air valves and the necessary electrical control and sequencing equipment, the following variable pressure cycle is obtained. (See Fig. 1):

A—The lower side of both pistons is opened to exhaust and air applied on the upper side of both pistons giving a large force on the electrodes. The initial large force, which is about three times the welding force, compresses the material together at the point to be welded, giving better contact between the electrodes and the sheets and also giving a more even contact at the faying surfaces of the sheets.

B—Air is admitted to the lower side of the upper piston counteracting its downward force leaving only the force of the smaller lower piston on the electrodes. At the proper time, the main contactor closes and the charging current starts flowing.

C—When the charging current has reached the proper magnitude, the main contactor opens and the secondary welding discharge takes place. After the welding current reaches the maximum, but before the current stops flowing entirely, the lower side of the upper piston is opened to exhaust so that the larger force is again applied on the electrodes. The high force on the weld gives a forging action which prevents the formation of cracks as the weld cools.

D—The upper side of both pistons is then opened to exhaust and air admitted on the lower side of the smaller piston to raise the upper head, completing the welding cycle.

The first 40-kw. machines used at the Lockheed plant were manufactured in France and did not prove to be entirely satisfactory in production for the following reasons:

(a) Excessive maintenance was required to keep the machines operating satisfactorily.

(b) The sequencing controls were inadequate.

(c) The machines were too slow.

Since then, manufacture of these machines has been transferred to this country, and many improvements in design, better workmanship and the use of better materials have greatly improved their performance. These improved spot

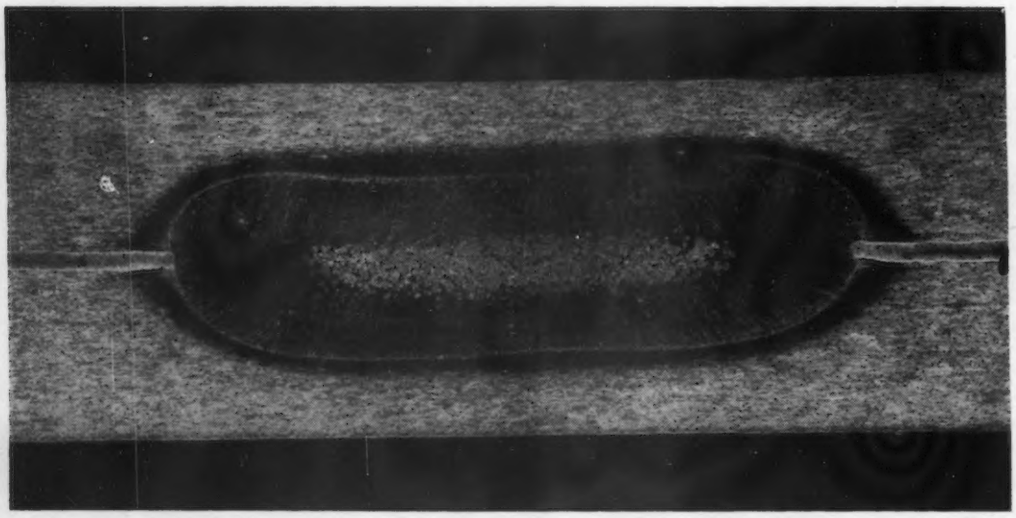

FIG. 2—Photomicrograph (25 X) of spot weld made in two 0.064 in. 24ST alclad sheets under the conditions shown in the oscillogram, Fig. 1.

welders have contributed greatly to the rapid increase in spot weld production at Lockheed.

Growth of Department

In 1939 the entire Lockheed spot welding department, including six single-phase a.c. welders, the assembly section and the material cleaning section, occupied a rectangular area approximately 50 x 100 ft., or 5000 sq. ft. of floor space. As of Jan. 1, 1941, there were four single-phase a.c. welders and two PMCO-2S stored energy welders in the Lockheed production spot welding department. The assembly, cleaning and welding sections occupied a total floor area of approximately 6000 sq. ft. As of Nov. 1, 1941, there were five single-phase a.c. spot welders, two 450-kva. single-phase a.c. roll spot welders, 16 40-kw. stored energy spot welders and three 25-kw. portable welders in the department. The total floor area is now 36,504 sq. ft.

The principle aluminum alloys welded here are 24ST alclad, 52S, 2S, 3S, and base 24ST extruded sections to 24ST alclad. Of the total spot weld production about 80 per cent is in 24ST alclad, 10 per cent 52S aluminum, 3 per cent 2S, 2 per cent 3S, and 5 per cent base 24ST. The above production averages are for all types and sizes of aluminum alloy assemblies ranging from small inaccessible boxes containing 10 or 15 welds to large open panels containing several hundred welds. The largest assembly spot welded is the P-38 intercooler skin assembly which is approximately 15 ft. long by 35 in. wide and contains about 6000 welds. Typical spot welded assemblies are motor cowling, floor supports, window frames, nacelle cowling air ducts, wing ribs, doors, removable panels and stabilizer leading edges.

Big Rise in Production

During recent months spot weld production at Lockheed has increased very rapidly. The production rate for *aluminum alloys only*, for example, averaged 450 spots per welder per hr. for the week ended July 5 (see Fig. 3), and 850 spots per welder per hr. for the week ended Oct. 31, an increase of 89 per cent.

For the same period, July 5 to Oct. 31, the average number of assemblies completed per week, by all three shifts, has increased from 22,000 to a maximum of 29,600 (see Fig. 4). The total number of man-hr. per week, including all assembly, cleaning, supervision and welding in this department has, during this same period, decreased from 61,000 to 44,000, releasing 150 experienced aircraft men for work in other departments. The assemblies completed per man-hr. has increased from 0.35 to 0.625.

The greatly increased spot weld production rate and the general increase in efficiency of the spot welding department can be attributed to the following factors:

1—Planned and controlled scheduling and routing of work to welding machines:

(a) Performing all assembly work at benches—not at the welder.

(b) Routing work to the type of welder best suited for the particular job.

(c) Routing all jobs requiring special set-ups to one of two or three welders that operate constantly with special tooling, thereby eliminating unnecessary set-up time.

(d) Routing jobs of a certain material and thickness combination, which require no special tooling, to

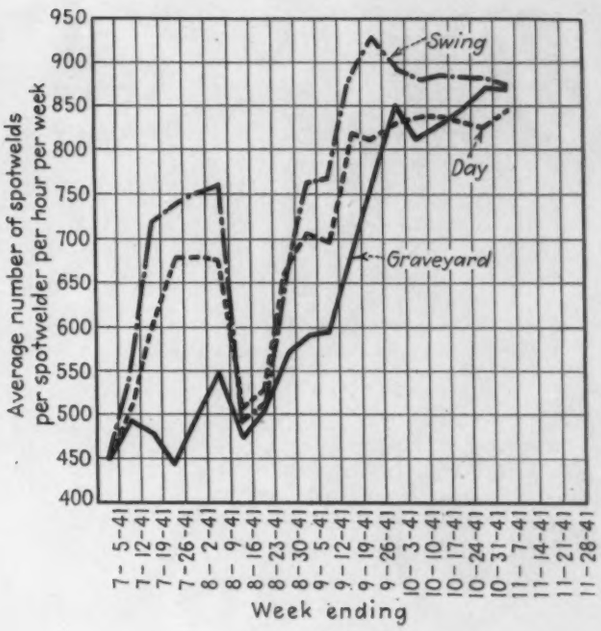

FIG. 3—The individual production rate in terms of aluminum spot welds per hr. per welder increased 89 per cent between July 5 and Oct. 31, 1941, due to a number of factors outlined in the text. A more recent improvement in technique should raise the departmental output to 1000 spot welds per hr. per machine.

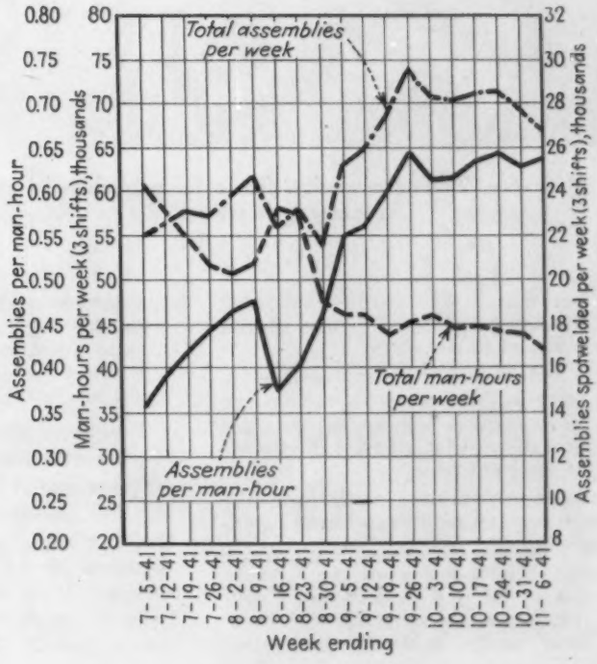
Total assemblies per week
Total man-hours per week
Assemblies per man-hour
Assemblies per man-hour
Man-hours per week (3 shifts), thousands
Assemblies spotwelded per week (3 shifts), thousands
Week ending

FIG. 4 — Increase in the overall efficiency of spot welding has resulted in greatly increased output per man-hr. and hence greater overall production, with a much smaller working force.

FIG. 5—Welding a window frame for a Hudson bomber with one of the reactor type stored energy welders.

one of eight or 10 welders that may already be adjusted for the specific material to be welded.

(e) Planning and scheduling work in bench assembly section and re-assembly section so that the right type of job is at a particular welder at the right time.

2—Improvements in the pre-spot weld cleaning method and shop equipment:

(a) Installation of four tanks 3 x 17 ft. by 6 ft. deep and a drying oven of the same size with overhead crane and stainless steel baskets into which parts are loaded for cleaning.

(b) Installation of electric timers at tanks requiring accurate control of time factor.

The installation of new cleaning equipment eliminated all hand operations except loading and unloading the baskets. Before installing the new equipment, 28 men were required per shift in the cleaning section. It is now possible to do twice as much work with only four men per shift. *Ten thousand* parts ranging in size from a small angle ¾ x ¾ in. by 6 in. long to an intercooler skin 3 x 15 ft. have been cleaned in one 8-hr. shift.

The time of etching the various kinds and thicknesses of material in the 3 per cent hydrofluoric acid solution has been greatly reduced since all grease and foreign materials are first removed by a 5-min. wash in a soap solution at 170 deg. F. A cleaning schedule for the various materials has also been set up and is maintained, thereby insuring consistent results. When parts are handled a few at a time by hand, it is extremely difficult to control the process.

The cleaning schedule which has been set up with the new equipment is as follows:

Operation 1—Tank No. 1—Soak in a hot soap wash for 5 min. to remove all dirt, grease and other foreign materials.

Operation 2—Tank No. 2—Rinse parts thoroughly in cold running water with air agitation.

Operation 3—Tank No. 3—Etch parts in 3 per cent hydrofluoric acid solution as per the following schedule:

Material Thickness, In.	*Time of Etching, Sec.*
0.016	20
0.020	25
0.025	30
0.032	35
0.040	40
0.051	45
0.064	50
0.081	55

Operation 4—Tank No. 2—Rinse parts thoroughly in cold running water with air agitation.

Operation 5—Tank No. 1—Soak in hot soap solution to loosen grayish deposit on surface of alclad parts.

Operation 6—Tank No. 2—Rinse in cold running water. (Inspect: If parts are still dirty, repeat Operations 5 and 6.)

Operation 7—Tank No. 4—Rinse parts thoroughly in final hot rinse.

Operation 8—Dry parts thoroughly in hot air drying chamber.

3—Installation of improved types of stored energy welding machines.

(a) All 40-kw. spot welders have been returned to the manufacturer and rebuilt according to the latest changes and improvements.

4—Proper maintenance. The new machines will operate satisfactorily at a speed of 100 spots per min. on 0.018 in. stainless steel and 50 spots per min. on 0.032 in. 24ST alclad.

These welders are operating 22½ hr. per day, but very little time is lost due to breakdowns, because of the excellent work of competent electricians, who have been assigned to spot weld maintenance as a full-time job. The man in charge of the spot weld maintenance group is a very capable electrician and has had a number of years' experience in maintaining both a.c. and stored energy spot welders. A maintenance schedule has been set up whereby each machine is checked once each day and certain adjustments made. Other major maintenance jobs such as cleaning of secondary contact surfaces are performed once each month.

5—Improved shop layout and handling of material:

(a) Adequate working space has been provided around each welder to permit rolling parts trucks up to the welder.

(b) A small portable work table is provided for each welder.

(c) Special tables have been provided to support large assemblies while they are welded.

(d) Special portable racks are provided for parts that cannot be moved about in parts trucks. Standard parts racks are located at various points where storage of parts is necessary.

6—Assemblies which were not designed properly for spot welding and consequently could not be welded economically have been changed to riveting.

7—Changes in the design of spot welding electrodes, holders, etc.

(a) Electrodes have been redesigned to prevent overheating.

(b) Clamping blocks on welding arms have been redesigned to eliminate slipping of holders under high pressure. Clamping blocks have also been cut away slightly along half round cut-out in block to prevent holder from sticking in the block.

(c) Special welding arms and offset electrode holders that are properly cooled have been designed for inaccessible work.

(d) Refrigerating equipment is now being installed for supercooling the electrodes to a point below freezing. Installation of this equipment and further increases in overall efficiency will raise the average production rate per machine to approximately 1000 spots per machine per hr.

(e) A complete set of wrenches needed by the operator are kept at each welder.

(f) A complete set of special lathe fixtures and special tools has been provided for servicing electrodes and welding wheels. Ring gages and plug gages have been provided for checking electrode tapers and tapered sockets in holders.

FIG. 6—Roll spot welding (not seam welding) a fuselage bulkhead for the Hudson bomber. This 450-kva. a.c. machine averages over 4100 spot welds per hr. It is not a stored energy type.

o o o

The progress which has been made due to the various factors mentioned above would have been impossible without the full cooperation of the shop personnel and supervisors. Every man in the shop has cooperated to the fullest extent with the plant engineering department in trying out new ideas regarding the scheduling and routing of work. Many of the improvements made in both equipment and methods were suggested by the men doing the work.

The men in the shop have been very cooperative and have demonstrated their initiative by many ideas and suggestions. These men also have demonstrated that they know that "put out" or plain hard work is necessary to get "output." This is well demonstrated by the following facts:

(1) Record spot weld production in 0.018—0.018 in. stainless steel, by one operator, in 8 hr.—25,167 welds. Machine PMCO-2S.

(2) Record spot weld production in 0.032 in. 24ST alclad in 8 hr., 20,134 welds. Machine PMCO-2S.

(3) On open aluminum alloy assemblies, especially designed for spot welding, operators consistently produce from 8000 to 12,000 welds, depending upon the particular job and the thickness of the material to be welded.

(4) Average spot weld production per 24 hr. (22½ working hr.) of 16 stationary spot welders — 306,000 welds.

These data given above do not include the spot weld production of the two 450-kva. single-phase a.c. roll spot welders. These two machines have operated 22½ hr. per day as roll spot welders (not seam welding) for approximately six months, averaging 4137 welds per hr. or an average of 186,165 welds per 24 hr., for the two machines. The production of these machines in welding aluminum alloys is equal to that of five spot welders, consequently Lockheed feels that from the economical standpoint roll spot welding has great possibilities. By the time this article appears in print, there will be in operation two new PMM-2B stored energy roll-welders which will greatly increase production capacity.

Silicon Monoxide

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. . . Considerable evidence for the existence of SiO at steel making temperatures was presented last week. Herein, the authors conclude with data on the importance of SiO to steel making, and examine the metal reactions.

TO date there is no published information regarding the chemistry of silicon monoxide as a dissolved form in steel except in the paper to which this is a sequel.[36] The results of investigations at Battelle Memorial Institute on silicon-oxygen equilibria, which are reported in that preliminary paper, offer some information of an indirect nature, however, from which several interesting approximations may be developed. From the data obtained in that investigation, the thermodynamic properties of several reactions of the postulated silicon monoxide in liquid steel may be derived.

For clarification, the significant reactions can be grouped as: (1) Those in which SiO_2 is reduced to SiO by the other components in the system Fe-Si-O-H:

I $[SiO_2] + [Fe] \longrightarrow [SiO] + [FeO]$

II $[SiO_2] + (H_2) \longrightarrow [SiO] + (H_2O)$*

III $[SiO_2] + [Si] \longrightarrow 2\,[SiO]$

and, (2) Those in which Si reduces the other dissolved oxides to form SiO:

IV $[Si] + [FeO] \longrightarrow [SiO] + [Fe]$

V $[Si] + (H_2O) \longrightarrow [SiO] + (H_2)$*

**Note that the only equations not employing dissolved constituents are Equations II and V. Exceptions are these made for (H_2) and (H_2O) because the solubility relationships for H_2O are not known and because the expression as it stands is both valid and useful.*

The reduction of SiO_2 by Si belongs by definition to both groups, but is included only in the first.

For these reactions the equilibrium constants are:

$$K_I = [SiO]\,[FeO]^{**} \quad (= K_{SiO})^{***}$$

$$K_{II} = [SiO]\,\frac{(H_2O)}{(H_2)} \quad \ldots$$

$$K_{III} = \frac{[Si\text{-}O]^2}{[Si]} \quad \left(= \frac{1}{K_{SiO}}\right)$$

$$K_{IV} = \frac{[SiO]}{[Si]\,[FeO]} \quad \left(= \frac{1}{K^1_{SiO}}\right)$$

$$K_V = \frac{[SiO]\,(H_2)}{[Si]\,(H_2O)} \quad \ldots$$

***Since the experiments were all conducted in the presence of excess SiO_2, and the solutions in Fe were dilute, the activities of both [Fe] and [SiO_2] may be regarded as unity without introducing measurable error.*

****These parenthetical expressions relate to the equilibrium constants used in reference 36.*

Using the values derived by experiment in the present research,[36] it is possible to calculate these constants for 1550, 1600 and 1650 deg. C., and then obtain their equations as functions of temperature. This information is listed in Table I.

In Fig. 2, the first group of reactions, in which $[SiO_2]$ is reduced to [SiO] by the various components in the system, is depicted as a plot of log K versus 1/T. The slopes of the curves for these reactions signify that with increasing temperature $[SiO_2]$ transforms more readily to [SiO]. This is consistent with the recognition of silicon monoxide as a high temperature form.

In Fig. 3, the second group of reactions, in which [Si] is oxidized to [SiO] by various other oxide forms in the system is similarly depicted. The constant for equation III is repeated in this figure. The slopes of these curves signify that Si will reduce SiO_2 and H_2O to form SiO with increasing efficacy as the temperature increases; but that the ability of Si to deoxidize FeO, with the assumed formation of SiO in this particular case, lessens as the temperature increases, which is well known. In other words, at higher temperatures the oxides of silicon become progressively less stable in contact with iron.

From the relationship:

$$\Delta F^\circ = -\,RT\ln K = -\,4.575\,T\log K$$

the standard free energy changes of the five reactions can be derived:

I $[SiO_2] + [Fe] \longrightarrow [SiO] + [FeO]$
$\Delta F^\circ = +\,94{,}500 - 38.7\,T$

II $[SiO_2] + (H_2) \longrightarrow [SiO] + (H_2O)$
$\Delta F^\circ = +\,48{,}000 - 13.5\,T$

III $[SiO_2] + [Si] \longrightarrow 2\,[SiO]$
$\Delta F^\circ = +\,73{,}800 - 34.1\,T$

IV $[Si] + [FeO] \longrightarrow [SiO] + [Fe]$
$\Delta F^\circ = -\,20{,}900 + 4.58\,T$

V $[Si] + (H_2O) \longrightarrow [SiO] + (H_2)$
$\Delta F^\circ = +\,25{,}800 - 2.06\,T$

Similarly, the values for the standard entropy change and the heat of reaction, which is considered constant over the temperature range under consideration, can be determined. They are listed, along with standard free energy changes calculated for 1600 deg. C., in Table II.

There is very little information with which these values can be

compared. Zintl[31] calculated several heats of reactions based on very rough estimates:

(1) $(SiO_2) + (Si) = 2\,SiO$ (vapor)
$\Delta H = 165{,}000$ calories

(2) $(SiO_2) + (C) = SiO$ (vapor) $+ CO$
$\Delta H = 160{,}000$ calories

(3) $2(SiO_2) + SiC = 3SiO$(vapor) $+ CO$
$\Delta H = 355{,}000$ calories

The temperature range lay between steel making temperatures and those of the electric arc; consequently, little can be said for the significance of these figures. They are the only calculations on record, however, and only equation I, which is analogous to equation III in the present work, has any semblance to the steel making reactions under consideration. Then the components are all separate phases, whereas in the present study the components are dissolved in the common solvent, liquid iron, with the exceptions cited for H_2 and H_2O.

Determination of the actual concentration of SiO in liquid steel must await further research. Nevertheless, solution by simultaneous equations[36] leads to values that fit the experimental data so closely that they merit some consideration until a method for direct measurement can be found.

For the consideration of SiO in liquid steel, equation I represents the most noteworthy reaction, because it signifies that [SiO] increases as [FeO] decreases. Consequently, a total silicon analysis of steel will include a proportion of [SiO] that will increase as the total silicon content increases. This relationship of [SiO] to [ΣSi] is shown in Fig. 4, using the values derived from the present research, where [SiO] is expressed in terms of [Si] so that $[Si] + [Si_{SiO}] = [\Sigma Si]$.

A glance at the two equations:

$$[FeO] + [SiO] = [SiO_2] + [Fe]$$
$$2[FeO] + [Si] = [SiO_2] + [Fe]$$

shows that [Si] increases as the *square* of 1/ [FeO], whereas [SiO] increases only as the linear reciprocal of [FeO]. Consequently, the increase of [SiO] with [ΣSi], shown in Fig. 4, is considerably less rapid than the corresponding increase of [Si]. To illustrate this relationship, the ratio of [SiO]:[Si] is plotted as a function of [ΣSi] in Fig. 5.

Equation I is again noteworthy because it shows that the total oxygen content of steel should reach a minimum as silicon is added, and should then proceed to increase as the silicon content, and hence the SiO content, increases, although [FeO] continues to decrease. This relationship of dissolved monoxides has received no consideration heretofore in studies on the chemistry of steel making. If the relationship is valid, and it appears to be, the total oxygen content of steels containing such dissolved forms must follow the type of curve shown in Fig. 6, which was calculated from the derived [SiO] values just mentioned.

Such a picturization of oxygen in steel is unprecedented except for those desultory opinions that cast iron, high silicon steel, etc., often seem to contain much more oxygen than can be expected from extant data on the equilibria.

Table II

Equation No.	ΔF° at 1600°C., Calories	ΔH, Calories	ΔS°, Calories Per Deg.
I	+22,000	+94,500	+38.7
II	+22,700	+48,000	+13.5
III	+10,000	+73,800	+34.1
IV	−12,300	−20,900	− 4.58
V	+22,000	+25,800	+ 2.06

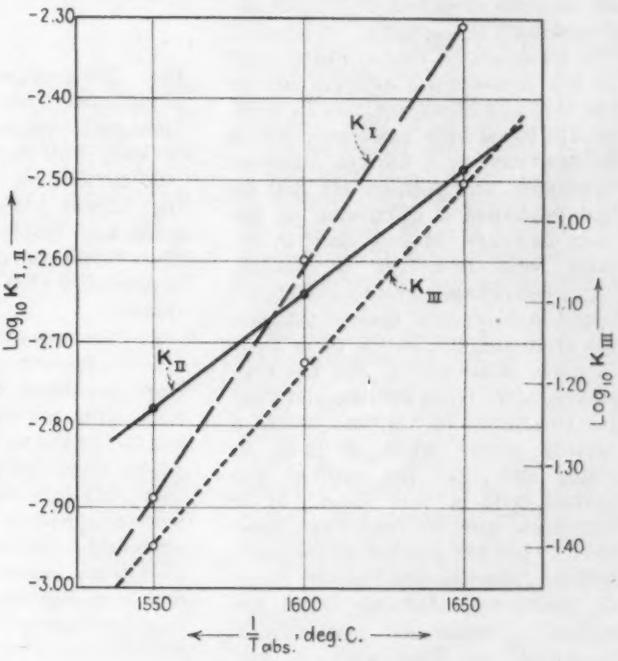

FIG. 2—Change of equilibrium constants with temperature for the group of reactions in which $[SiO_2]$ is reduced to [SiO] by the components in the liquid system Fe-Si-O-H. The slopes of these curves for all three reactions show that $[SiO_2]$ tends to transform to the monoxide form, [SiO], with increasing temperature.

Table I

Equilibrium Constant	Variations with T (°K.)	Value of the Constant 1550°C.	1600°C.	1650°C.
$K_I = [SiO]\,[FeO]$	$\log K_I = \frac{-20{,}690}{T} + 8.46$	0.0013	0.0025	0.0048
$K_{II} = \frac{[SiO]\,(H_2O)}{(H_2)}$	$\log K_{II} = \frac{-10{,}490}{T} + 2.96$	0.0016	0.0023	0.0032
$K_{III} = \frac{[SiO]^2}{[Si]}$	$\log K_{III} = \frac{-16{,}130}{T} + 7.45$	0.04	0.067	0.11
$K_{IV} = \frac{[SiO]}{[Si]\,(FeO)}$	$\log K_{IV} = \frac{+4{,}560}{T} - 1.00$	31.5	27.0	23.0
$K_V = \frac{[SiO]\,[H_2]}{[Si]\,(H_2O)}$	$\log K_V = \frac{-5{,}640}{T} + 4.50$	25.5	30.5	36.5

Slag Reactions

The role of SiO in the chemistry of refractories and slags, it seems reasonable to expect, may be at least as important as its role within the liquid metal. Indeed, silica and silicate refractories and slags are not too well understood, and the consideration of any new viewpoint is warranted.

From the present work, no precise information can be gained with respect to slags and refractories except by way of inference. Nevertheless, numerous so-called "anomolies" found described in the literature can be explained so simply on the basis of silicon monoxide that they invite further study.

For example, over 80 years ago, in the 1850's when metallurgical discussions were first being recorded, an English metallurgist who collected slag samples found an unusual specimen, " . . . of extraordinary scientific interest."[2] The metallurgist was J. Percy; and in his presidential address before the Iron and Steel Institute in 1886[3] he discussed this specimen, which he described as a fibrous, siliceous aggregate, and pointed out that he had published a discussion of the piece 22 years before. Blair[4] in the same year described a similar, " . . . remarkable white substance," found in botryoidal masses between the iron and brickwork of a blast furnace. Blair stated that the substance, after lying for one and then for two years in his desk, made a hissing sound when dropped in water and that the evolved gas burned with a blue flame. It is humorous now to read that Blair tried to boil the gas out of the piece without success and, as the *pièce de résistance*, that he found the substance would not give off its "occluded" gas when placed in turpentine instead of water. It is very likely that the substance consisted of the room temperature decomposition products of silicon monoxide. SiO (or $Si.SiO_2$) reacts with water to liberate hydrogen, and hydrogen burns with a blue flame.

In discussing Blair's paper, Bell introduced another interesting aspect of this subject: The observation that pig iron sometimes became covered with silica. Turner,[5] a year later, described an observation even more closely conforming to the present conception of SiO in silicon iron or steel. Turner found not only the exterior of castings to be coated with fibrous silica, but also the linings of internal cavities. The most readily forthcoming explanation was that Si exudes from cast iron much as does carbon in kish, but Turner found it difficult to account on that basis for the fibrous structure of the oxidized and for the fact that it was also found in cavities where the opportunity for oxidizing seemed remote.

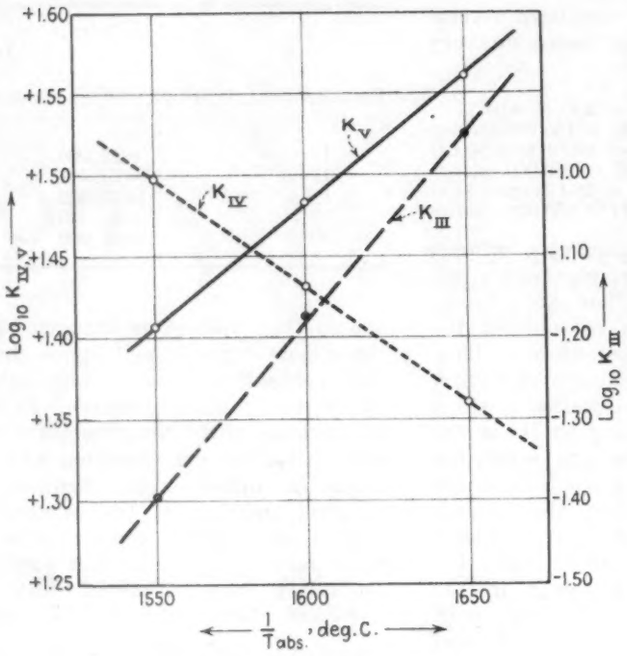

FIG. 3—Change of equilibrium constants with temperature for the group of reactions in which [Si] reduces the oxides in the system Fe-O-Si-H, to form [SiO]. The slopes of the curves indicate that $[H_2O]$ and $[SiO_2]$ react more readily with [Si] as the temperature rises, but that [FeO] is less easily reduced by [Si] at higher temperatures. Thus, Fe, which will reduce $[SiO_2]$ to [SiO], will likewise reduce [SiO] to [Si]; and [Si] becomes less effective as a deoxidizer when the temperature is raised.

In the present research, high-silicon specimens of carbon-free iron quenched directly from the melt often showed a siliceous coating on the lining of interior cavities whose access to either air or water was highly improbable. Silicon monoxide stands as a satisfactory explanation for such a phenomenon. The high vapor pressure of SiO makes its exudation likely, and such coatings may, therefore, be expected.

An interesting observation of what may have been silicon monoxide occurs in the published work of Chipman and Ta Li.[27] These investigators were studying the chemistry of liquid iron in carefully dried atmospheres of H_2 and H_2S. When a silica crucible was used to hold the iron, they observed that:

> "Due to the sublimation of silica, a great deal of black, amorphous substance collected on the top of the crucible and on the furnace wall. This substance can be decolorized easily by immersing it in HCl, but the main bulk of the substance remained undissolved. This substance, then, must be mainly silica (possibly with some elementary silicon) colored black by iron and FeS which evaporated from the melt and finally condensed with this silica."

SiO_2 actually has a scarcely measurable vapor pressure at steel making temperatures when under oxidizing conditions. Because vapor pressure is only a function of temperature, all other measurements made under conditions where the vapor pressure appears high must be discarded; consequently, it could not have been silica that vaporized. Those authors specify that there was no oxygen in the atmosphere, which would be necessary for forming SiO_2 from vaporized metallic silicon. Furthermore, analyses showed that the iron had gained a large amount of silicon, hence silica had been reduced, as would be expected in an atmosphere of H_2 and H_2S. Thus it is possible that the semi-reduced form, SiO, was the agent responsible for their observation.

In the present investigation observations of the same type were frequently made that conformed with the proposed role for silicon monoxide. A sublimate similar to the one described by Chipman and Ta Li, though not discolored by sulfides, could be produced in varying degrees at will simply by varying the oxygen pressure in the system. Under comparatively oxidizing conditions, no trace of a silica sublimate was ever found, which is consistent with the known low vapor pressure of SiO_2; but, as the

atmosphere was made more reducing, a sublimate soon appeared that became more voluminous as the conditions became more reducing. The same observations have been made by others.[22]

The silica crucibles devitrified more rapidly under reducing conditions, which is an observation that has also been made by others.[22] That behavior again indicates that the vapor pressure of SiO_2 at elevated temperatures is probably much lower than popularly assumed, and that its apparently great tendency to vaporize under certain conditions is really related to a monoxide reaction. The dependence of the volatility on the oxygen pressure of the environment could thereby be explained. Likewise, these observations indicate that silicon monoxide may play an important part in the recrystallization of vitreous silica at elevated temperatures.

Another possible occurrence of silicon monoxide may be in the silicizing of steel. Schmitz[17] found a white powder on the porcelain tube after cementing steel with silicon in a hydrogen atmosphere. Reduction of SiO_2 in the refractories to vaporous SiO could be expected, but his assumption that certain condensates were silicon hydride might be questioned.

The most stimulating observations that can involve SiO, however, are found in discussions on the behavior of silica at high temperatures. Sosman, in his book, "The Properties of Silica,"[22] states that:

> "... The most striking fact about the crystallization of vitreous silica to cristobalite is that it begins only at the surface and proceeds inward."

This phenomenon was also observed in the present work and was found to vary in degree with the hydrogen content of the atmosphere. He later states:

> "... The rate of crystallization of vitreous silica to cristobalite may also be influenced by the composition of the gas with which it is in contact."

and points out that one investigator reported having made a new kind of cristobalite by fusing silica in an oxy-hydrogen flame and then heating it at 1600 deg. C. for 5 hr. These observations are inconsistent with the kinetics of crystalline transformation and certainly suggest that a chemical factor, such as SiO, is operating.

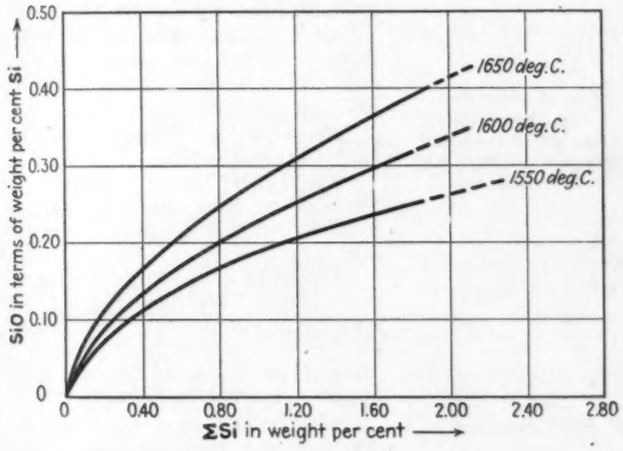

FIG. 4—This graph shows the calculated concentration of SiO in liquid steel in relation to the total silicon content. Values are calculated for equilibrium in the system Fe-O-Si-H.

Again, Sosman states that:

> "... not all of the observed vaporization of silica is a true evaporation of the compound SiO_2. ... In addition to its true evaporation there is under certain conditions an apparent evaporation which is not due to vaporization at all but to reduction and re-oxidation. In a reducing atmosphere, such as exists in a carbon-tube electric furnace, abundant white vapors of silica are frequently seen, which result from (1) the reduction of SiO_2 to Si, (2) volatilization of the silicon, which is much more volatile than silica, and (3) reoxidation of the Si to SiO_2 either through admixture with air or through recombination with the original oxygen in a cooler part of the furnace."

As an alternative to this explanation, the commonly accepted one, the formation of SiO, which then breaks down into Si + SiO_2, could be considered. Biltz and Ehrlich,[28] who demonstrated that Si can vaporize as a suboxide, showed that SiO_2 is non-volatile and that Si itself should vaporize only 10 per cent as much as was observed for the materials in question.

Sosman concludes by reviewing the work of Dufour, who showed that silica in contact with H_2, O_2, and CO, respectively, sublimed only when in contact with H_2, which conforms with the present reasoning. Numerous observations of the volatility of SiO_2 when in contact with carbon at high temperatures are also discussed. The sublimates in most cases were found to differ from vitreous silica both in density and in hardness, which suggests that the substance could not have been SiO_2. The difference noted in hardness alone invites assuming that another form exists. Thus, the other form might be the SiO or $Si.SiO_2$ decomposition product, for conditions were reducing.

It is possible that one or more

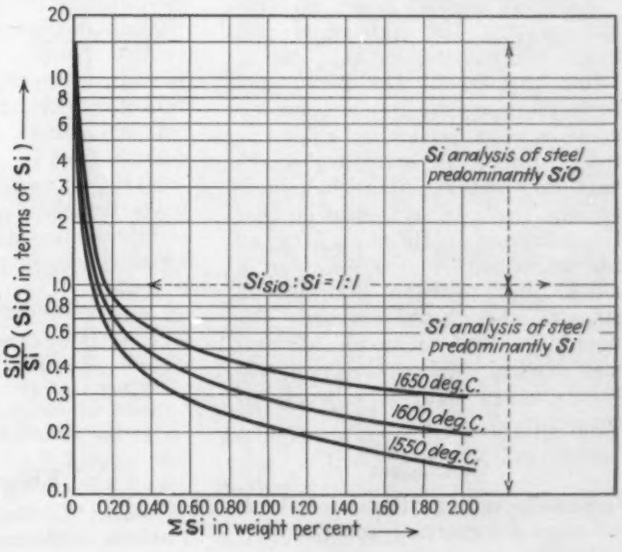

FIG. 5—Ratio of [SiO] to [Si], plotted against [ΣSi] to show the calculated distribution of silicon in steel between [Si] and [SiO].

of the many "microforms" of silica discussed in Sosman's book also relate to silicon monoxide either directly or indirectly. For example, it is stated that fine white fibers were found in pig iron by Mallard, in agreement with the observations of Bell and Tucker just mentioned. SiO_2 is reduced by all three of the principal ingredients of pig iron; consequently, it is difficult to see how SiO_2 could survive as such through the melting period. Those fibers may very likely have been from previously dissolved silicon monoxide, although the substance observed at room temperature was SiO_2 or $Si.SiO_2$. As described before, the monoxide may form SiO_2 both by decomposition and by oxidation.

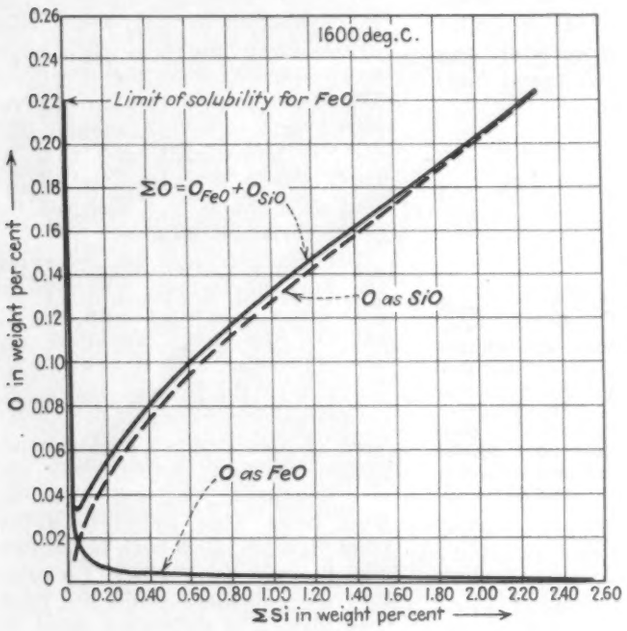

FIG. 5—Plot showing how [SiO] may affect the total oxygen content of steel at 1600 deg. C.

Although Sosman makes no mention of SiO, the statements just listed, and many more that can be found throughout the book, conform so closely to the observations made and the conclusions drawn in the course of the present research that they deserve further investigation. There is an indication that the monoxide of silicon may play an important part in the behavior of silica, and probably likewise of silicates, at high temperatures. The possibility that monoxide silicates may exist at steel making temperatures brings with it a world of conjecture.

Conclusions

The foregoing discussion leads to several important conclusions:

(1) Silicon monoxide not only may exist at steel-making temperatures, but may be of signal importance in the deoxidation process.

(2) Silicon monoxide may conceivably be formed in liquid steel from reduction of SiO_2 or from oxidation of Si. The five principal equations for such reactions in the system Fe-O-Si-H have been defined and their thermodynamic properties calculated on the basis of results obtained from an investigation of silicon: oxygen equilibria in liquid iron.

(3) Increasing temperature and decreasing oxygen pressure favor the formation of [SiO]. Consequently, as [FeO] diminishes, the total oxygen content of steel may actually increase. The calculated quantitative relationship of [SiO]: [Si] in respect to ordinary silicon content may be predominantly [SiO]; whereas at higher silicon contents, although [SiO] is also a maximum there, the predominating form is [Si].

(4) Certain unexplained behaviorisms of slags and refractories at high temperatures may be caused by silicon monoxide.

Acknowledgment

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Bibliography

[1] Blair, T., "On Certain Accessory Products of Blast Furnaces," *Journal of the Iron and Steel Institute*, Vol 29, 1886, pp. 81-87.

[2] Percy, J., President's Address, *ibid.*, Vol. 29, 1886, pp. 8-31.

[3] Turner, T., "Production of Silica from Cast Iron," *ibid.*, Vol. 31, 1887, pp. 203-211.

[4] Winkler, C., "Reduction of Oxygen Compounds by Magnesium," *Ber. Deut. Chem. Ges.*, Vol. 23, 1890, pp. 2642-2668.

[5] Lemaire, F. E., "A Monoxide of Silicon," *L'Industria Chem.*, Vol. 8, pp. 182-183; also, *Le Genie Civil*, Vol 52, 1905, pp. 274.

[6] Potter, H. N., French patent 360,875, 1905; British patent, 26,788, 1905; and German patent, 182,082, 1905.

[7] Tone, F. J., "Silicon in the Electric Furnace," *Transactions of the American Electrochemical Society*, Vol. 7, 1905, pp. 243-249.

[8] Potter, H. N., British patent, 1279, 1906; French patent, 366,644, 1906; German patent, 189,833, 1905.

[9] Albro, A. B., "Analysis of Silicon Compounds," *Transaction of American Electrochemical Society*, Vol. 12, 1907, pp. 229-239.

[10] Potter, H. B., "Monox," *ibid.*, Vol. 12, 1907, pp. 215-222.

[11] Potter, H. N., "Production of 'Monox,' a New Electric Furnace Product," *ibid.*, Vol. 12, 1907, pp. 223-228.

[12] Potter, H. N., "Silicon Monoxide," *ibid.*, Vol. 12, 1907, pp. 191-214; and abstract in *Engineering*, Vol. 85, 1908, p. 722.

[13] "Silicon Monoxide and Its Use," *Engineering*, Vol. 85, 1908, p. 722.

[14] Bock, F., "Several Innovations in the Technical Utilization of Silica," *Chem. Ztg.*, Vol. 35, 1911, pp. 231-232.

[15] Hermann, S., "Innovations in the Realm of Silicon Compounds," *Electrochem. Zeit.*, Vol. 17, 1911, pp. 190-192, 220-223, 250-253, and 279-281.

[16] Potter, H. N., "Process of Preparing SiO," United States patent, 1,104,384, July 21, 1914.

[17] Schmitz, F., "Influence of Gases on Iron Exposed to Their Action," *Stahl und Eisen*, Vol. 39, 1919, pp. 373-381 and 406-413.

[18] Flusin, R., "Silicon Monoxide and Oxycarbides. 'Monox and Fibrox,'" *Industri Chemique*, Vol. 9, 1922, pp. 391-394.

[19] "The Monoxide and Oxycarbides of Silicon," *Chemical Transactions Journal*, Vol. 71, 1922, pp. 445-446.

[20] Jevons, W., "On the Band—Spectra of Silicon Oxide and Chloride, and Chlorides of Carbon, Boron, and Aluminum," *Proceedings of the Royal Society*, Vol. 106A, 1924, pp. 174-194.

[21] Mellor, J. W., "A Comprehensive Treatise on Inorganic and Theoretical Chemistry," London, Longmans, Green & Co., Vol. 6, 1925, 1024 pages.

[22] Sosman, R. S., "Properties of Silica," New York, Chemical Catalog Co., Inc., 1927, 856 pages.

[23] Bonhoeffer, K. F., "Existence of Gaseous Silicon Monoxide," *A. Physik. Chem.*, Vol. 131, 1928, pp. 363-365.

[24] Jevons, W., "Ultra-Violet Band-System of Carbon Monosulfide and Its Relation to Those of Carbon Monoxide (the '4th Positive' Bands) and Silicon Monoxide," *Proceedings of the Royal Society*, Vol. 117A, 1928, pp. 351-375.

[25] Saper, P. G., "The Ultra-Violet Bands of SiO," *Physical Review*, Vol. 40, Series 2, 1932, p. 465.

[26] Saper, P. G., "Rotational Analysis of Ultra-Violet Bands of Silicon Monoxide," *ibid.*, Vol. 42, 1932, pp. 498-508.

[27] Chipman, J., and Ta Li, "Equilibrium in the Reaction of Hydrogen With Iron Sulfide in Liquid Iron and the Thermodynamics of Desulphurization," *Transactions of the American Society for Metals*, Vol. 25, 1937, pp. 435-465.

[28] Biltz, W., and P. Ehrlich, "Volatilization of Silicon as Lower Oxide," *Natürwissenschaften*, Vol. 26, 1938, p. 168.

[29] Kreimer, G. S., "Simultaneous Reduction of Oxides of Iron, Titanium, and Columbium with Aluminum," *Journal of Applied Chemistry, U.S.S.R.*, Vol. 13, 1940, pp. 267-270, and abstract, *Chemical Abstracts*, Vol. 35, 1941, p. 1735.

[30] Latimer, W. M., and J. H. Hildebrand, "Reference Book of Inorganic Chemistry," New York, MacMillan, 1940, 563 pages.

[31] Zintl, E., and others, "Silicon Monoxide," *Z. Anorg. Allgem. Chem.*, Vol. 245, 1940, pp. 1-7.

[32] Zintl, E., W. Morawietz, and E. Gastinger, "Boron Monoxide," *ibid.*, Vol. 245, 1940, pp. 8-11.

[33] Baumann, H. N., Jr., "X-ray Diffraction Examination of Material Having the Composition SiO," *Electrochemical Society preprint 80-9*, October, 1941, 3 pages.

[34] Woods, L. H., "On the Silicon Oxide Bands," *Bulletin of the American Physical Society*, April 17, 1941, p. 15.

[35] Zintl, E. W., W. Krings, W. Brauning, "Process of Removing Silica From Minerals, Slags, and Similar Materials," United States patent 2,242,497, May 20, 1941.

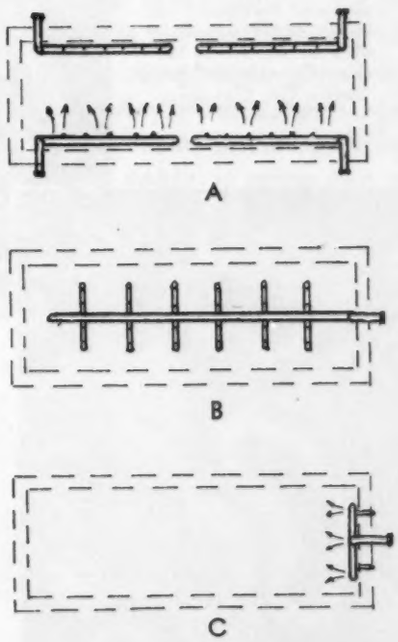
[36] Zapffe, C. A., and C. E. Sims, "Silicon-Oxygen Equilibrium in Liquid Iron," to be published by the American Institute of Mining and Metallurgical Engineers.

New Pickling Bath Agitator Jets

TO speed up production and reduce rejects in pickling without the expense and space required for installing additional pickling tanks, Heil & Co., Cleveland, has developed a new series of steam-air agitator jets. Increased operating rates, accomplished by uniform heat together with bath agitation, is claimed for these jets, which provide both temperature requirements and the agitation necessary over the area within their range. It is stated that mills have reported as much as 40 per cent tonnage increases and speeds increased from 70 to 110 ft. per min. in pickling operations by their use.

A feature of the new jets is that when the proper bath temperature has been reached, the steam is shut off and air agitation commences. Also, air admitted with the steam has several advantages over the use of straight steam, such as the saving of 10 per cent or more in acid consumption, effective pickling at lower acid concentrations, and an increase in the tonnage pickled.

The outstanding characteristic of these new jets is their orifice, a perforated Nocorodal (graphitic carbon) nozzle plate that is fastened to the tip of the jet. This plate is unattacked by the acid solution, being able to withstand boiling solutions with concentrations as high as 50 per cent. Furthermore, they have unusual resistance to mechanical wear by steam.



ARRANGEMENT of the steam-air agitator jets inside of the pickling tanks. (A) The E-3 type for continuous picklers, (B) the E-4 type for batch picklers, and (C) the E-12 type for tube picklers.

The jets, known as the E series, are made in three different styles: the E-3 type for continuous picklers, the E-4 type for batch pickling, and the E-12 type for tube pickling, as illustrated. The continuous pickler jets are installed at the bottom of the tank along its sides, and extend to the middle of the tank from each end, assuring complete agitation throughout the tank. Nozzle openings are spaced at about 15-in. intervals, and are directed horizontally along one side of the tank and vertically along the other side. This arrangement causes the pickle liquor to be agitated and circulated from below and rolled over the top of the continuous strip in a rotating manner.

A modification of the continuous pickler jets has been devised for batch pickling. These jets are built tree-shaped for placing centrally along the bottom of the tank. The nozzles force the pickle liquor up through the sheets, which are usually set on edge during the processing.

The E-12 jets for tube pickling are located at one end of the tank, and permit either steam or air to be blown into the bath, forcing the solution through the tubes. This action removes the ganister and permits effective pickling of the internal tube wall.

Arc Welded Light Boats

MANY advantages of welded steel construction of boats have been obvious, but construction of light pleasure, coast guard, or Naval patrol boats, by arc welding* presents special problems that arise in the relatively new art of steel boat fabrication.

** Welded construction of light boats by Revere Copper & Brass Inc., is described in THE IRON AGE, Aug. 14, 1941.*

Engineers at the Burger Boat Co., Manitowoc, Wis., find that one of the most positive advantages of the welded steel boat, aside from its admitted strength, fire-proof and leak-proof qualities, lies in the fact that water-proof bulkhead construction is feasible, permitting the construction of a safer boat. In a wooden boat the closure and sealing of sections is not considered good practice because the seams behind the bulkhead will leak slightly and rot is likely to set in.

In arc welded boats, as shown under construction in Figs. 1 and 2, water-tight bulkheads made of steel plate are utilized, as many as four to a boat. These are reinforced horizontally and vertically with flat bars, and the forepeak and forward engine room bulkheads are fitted with water-tight doors complete with suitable hardware for fastening and sealing.

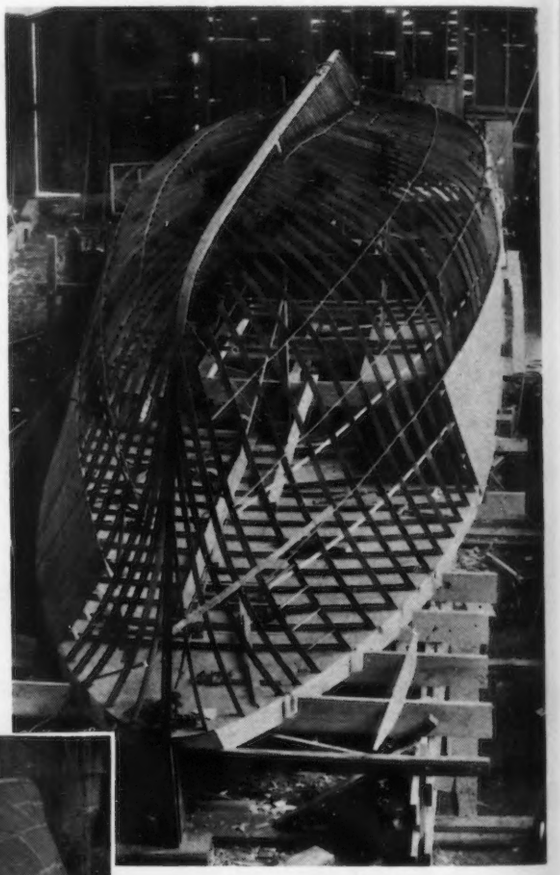
Steel decks are covered with a special compound containing pumice, which is worked and troweled on to the steel sub-deck to a thickness of about ½ in., and then buffed smooth, producing a white and gray speckled surface. This provides a quiet deck that is not slippery. The sub-deck is of steel plate, reinforced with butt bars and doubler plates at the deck fittings and deck openings. The plates are fastened to the beams with intermittent welds and at the sides to the shell plating with a continuous, water-tight weld.

Stuffing boxes to house the propeller shafts and openings, such as the rudder port in the bottom of the boat, do not present problems in welded construction, as it is only necessary to weld the tubes in place. The hawse pipe, which carries the anchor chain in the bow of the boat, also is welded to the plates in the boat. Engine foundations are firmly welded to the bottom of the boats. They are made of heavy ship channels, properly alined, bracketed and electric welded to the floor plates. Similar steel fabricated foundations are provided for auxiliary machinery, such as the generator, pumps and batteries.

The rub rail, or fender, which is a shock-resisting strip running around the boat to prevent damage when the craft rubs or bumps a dock while tied up or landing, is a steel U-section. This section is neatly drawn out at the ends and continuously electric welded to the shell plating in a fair line at the top and bottom edges.

RIGHT

FIG. 1—Arc welded construction of light boats permits the use of bulkheads, as many as four to a boat, reinforced vertically and horizontally, and the forepeak and engine room are fitted with water-tight doors. Courtesy of Lincoln Electric Co., Cleveland.



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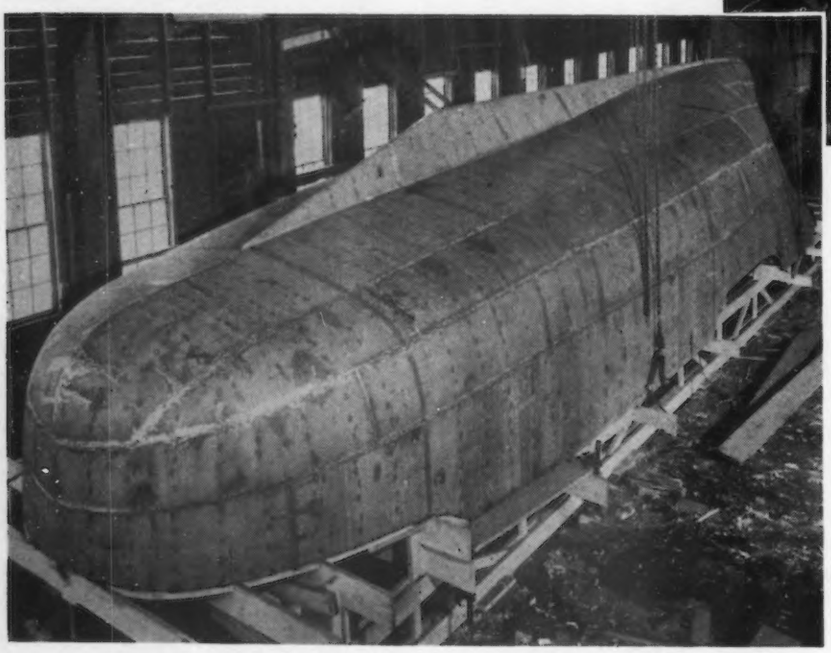
BELOW

FIG. 2—Plates, welded to the rib structure, permit strength, fire-proof and leak-proof qualities to be built into the boat, and also an added measure of safety by the use of bulkheads. Courtesy of Lincoln Electric Co., Cleveland.



Reclaiming Metal Scrap From Floor Sweepings

FIG. 1—Usable metal recovered from a non-ferrous foundry's floor sweepings and splashings. Material on right is the coarse concentrate averaging 70 to 75 per cent metal, while the fine concentrates (to the left), which have passed over the concentrating table, run 65 to 70 per cent metallics.

° ° °

By W. A. PHAIR
Associate Editor, THE IRON AGE

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. . . The increasing stringency of raw materials is focusing new attention on the reclamation of metal from all sources. A method used by a Westinghouse plant to salvage non-ferrous metal from foundry floor sweepings, skimmings and kindred sources is described in this article. This system, utilizing a concentrating table, is reported to be economically self-supporting.

RECLAMATION of metal from floor sweepings, furnace skimmings, cores, splashings and slag by a process that turns out a concentrate containing 65 to 70 per cent usable metallic content is a very practical and economical procedure at the non-ferrous foundry and reclamation plant of the Westinghouse Electric & Mfg. Co. at Linhart, Pa. This salvage operation, which converts close to 10 per cent of all the material charged into it to a reusable metal, represents not only a successful answer to a separation problem which has long perplexed industry, but is sufficiently thorough to make the salvaging operations economically self-supporting.

Reclamation of metal from floor sweepings and other similar sources in non-ferrous foundries has long been largely an academic subject in all but the larger plants. In most cases this lack of interest has been due to inability to make such operations economical on modest melting schedules.

A half-hearted stab at the problem, in the way of sifting gangway dirt in sand riddles, was about as far as the average foundry went in salvaging such material.

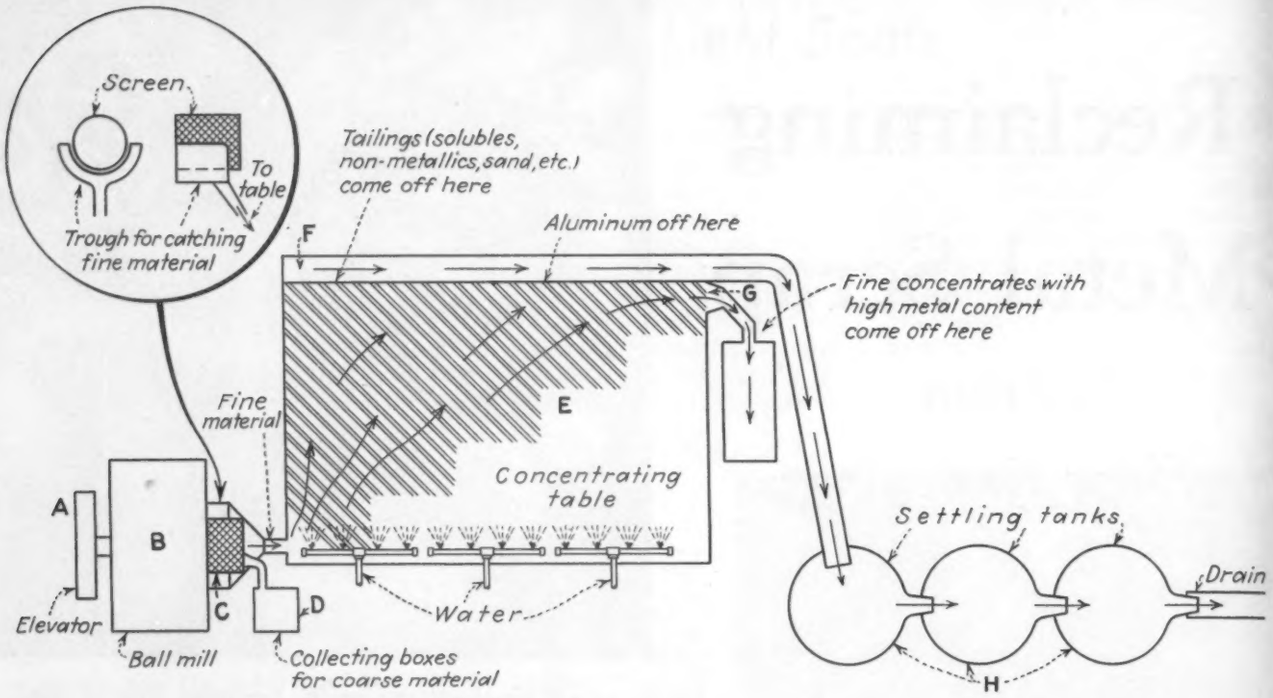
In ferrous foundries where the scrap is easily separated from the non-metallics by use of a magnetic pulley, reclamation is possible by simply putting the material over a magnetic separator. In non-ferrous plants, however, the absence of magnetism in the scrap metal has usually resulted in such sweepings being relegated to the dump heap, its metal content forever lost.

At the Westinghouse Linhart plant, however, the combination of an age-old separating process and a little ingenuity, wedded under the supervision of W. J. Laird, the plant supervisor, appears to have successfully solved this problem for non-ferrous foundries with moderate heats (the Linhart plant melts about 50 tons of brass, bronze and aluminum alloys daily), and may well lead to a new appreciation of the value of such common sources of valuable scrap metals.

Gates, risers, pigs and other large chunks of scrap metal are salvaged by the usual methods at Linhart. This article deals only with the reclamation of the very small particles of metal found in slag, sweepings, cores, furnace skimmings and kindred materials.

The essence of the Linhart technique is that of water concentrating, with the separation affected by the variances in the specific gravity of the metallic and non-metallic content of the source material.

Figs. 2 and 3 show the layout and



ABOVE

FIG. 2—Plan view of the Westinghouse reclamation unit shown in Fig. 3. Placement of riffles on this sketch is not accurate. See Fig. 4 for exact location of the riffles.

o o o

LEFT

FIG. 3—The reclamation unit used by Westinghouse to recover metals from floor sweepings and similar sources. In the foreground are three settling tanks. The ball mill is visible at the top of the illustration, with the concentrating table at right center. The loaded skids at left center contain the two types of reclaimed concentrates shown in Fig. 1.

components of the reclamation unit. The ball mill is a standard Marcy unit, while the concentrating table is a regular product of the Deister Concentrating Co., except that the riffles (the small oblique cross bars which interrupt the flow of the material across the table, see Fig. 4) have been relocated.

The course taken by the source material is, briefly, as follows: It is charged into the vertical belt conveyor (A, Fig. 2) at floor level and raised and emptied into the ball mill (B). There slag and other lumps are reduced in size and some separation of the metal is performed as the crushing of the lumps releases some of the metal imbedded in the larger chunks of slag etc. From the ball mill the material works out the exit (C) where it passes over a screen which separates it into fine and coarse material.

The coarse material, which consists of fairly large pieces of metal (see Fig. 1) which cannot be broken in the mill, and which is about 70 to 75 per cent rich in metallics, passes directly into a hopper (D), ready for the refining furnace. The finer material, which, as it leaves the mill, contains a very heavy portion of such non-metallics as sand, slag, etc., runs onto the concentrating table (E).

This table has the usual eccentric motion, with a stream of water, originating at the higher side, playing across its face. The response of the material to the forces

set up by the movement of the table have a direct relationship to the specific gravity of the various components of the material. The lighter materials are enabled to progressively hurdle the riffles, while the heavier material, (sand and other non-metallics) being unable to cross the table, are washed down the length of the riffles by the water.

Thus, the lighter solubles and non-metallics pass off the table at the end nearest the ball mill (F), while the solubles go directly over the riffles in the stream. The progressively heavier non-metallics leave in the order of their specific gravity along the entire length of the table. The heavier, metallic particles pass off at the far end in a separate channel (G).

Two separate exits from the table are provided, one a gutter running the length of the table which handles the light non-metallics and solubles, and a second at (G), over which the usable metallics move. The average metallic content of the tailings (non-metallic particles and the aluminum-containing material together) is between 0.1 and 0.2 per cent.

Use Three Settling Tanks

The non-metallics are led into three settling tanks (H), while metallics are carried directly into a hopper where the water is permitted to drain off. The metal content of this fine concentrate (see Fig. 1) averages 65 to 70 per cent when dried. The average analysis of the metal content of this concentrate runs 2 to 3 per cent Pb, 2 to 3 per cent Sn, 10 to 12 per cent Zn, 1 per cent impurities, balance Cu.

Three settling tanks are used at Linhart for convenience in handling. The material ending in these tanks is transported in buckets to the dump heap.

Between 8 and 10,000 lb. of material, wholly generated within the Linhart foundry, can be fed into this unit daily, with from 5 to 10 per cent, by weight, resulting in reclaimed metal. This percentage of returns has proved to be sufficiently high to make the effort economically self-supporting.

The fine and coarse concentrates are held until approximately 100,000 lb. is collected. It is then charged loosely into an open hearth, refined, and cast into 80 lb. ingots.

As these concentrates originate wholly within the plant, it is possible for experienced operators to forecast very closely the analysis of the ingot, a factor which tends to simplify manipulations of the refining operation.

Some Zinc Lost

Some zinc, from 3 to 4 points, is lost in refining. In the finished ingot, the Zn is held to a trace, usually less than 0.02 per cent. Some Pb and Sn are also lost, due largely to the metallurgical manipulations required to remove the trace of Al and Si in the material. Al and Si are removed by oxidation. The remaining Fe is only that which passes the magnetic separator, ordinarily about 0.25 per cent. Mill scale is frequently used for this purpose, although on occasion compressed air is employed. The open hearth is completely cleaned after each heat to avoid any possibility of contamination should an off heat be encountered.

The ingots of each heat are accurately identified by markings and this identification is carried to an analysis sheet kept on file in the plant office. When a heat is to be made up the laboratory selects the analysis of the reclaimed metal from its file best suited to the compounding required and specifies the workings on the reclaimed ingot to be used.

When a heat is compounded in the foundry, the reclaimed metal is used only to the extent that its composition will fit into the desired final analysis. In other words, there are no shotgun compoundings. If the analysis does not fit, it is not used. The laboratory is the supreme authority.

The importance of personnel in any reclamation effort cannot be over emphasized. With experience,

FIG. 4—Details of the concentrating table, showing the placement of the riffles. The fine concentrates can be seen running off the table at the lower right-hand corner.

operators can identify the material going into the furnace with really remarkable accuracy and are thus enabled to make required adjustments to provide a desirable analysis.

To call such reclaimed metal secondary metal is really a misnomer. Actually many of the heats of reclaimed metal have a more desirable analysis than some purchased material. From a practical viewpoint, the refining of reclaimed metal in most cases presents no more difficult metallurgical problems, that cannot be overcome with the proper equipment, than that met in producing metal from the ore.

The Linhart plant, in addition to reclaiming the sweepings, does considerable work reclaiming scrap for other divisions of the Westinghouse company. Its practice here, however, follows the general technique used for this purpose.

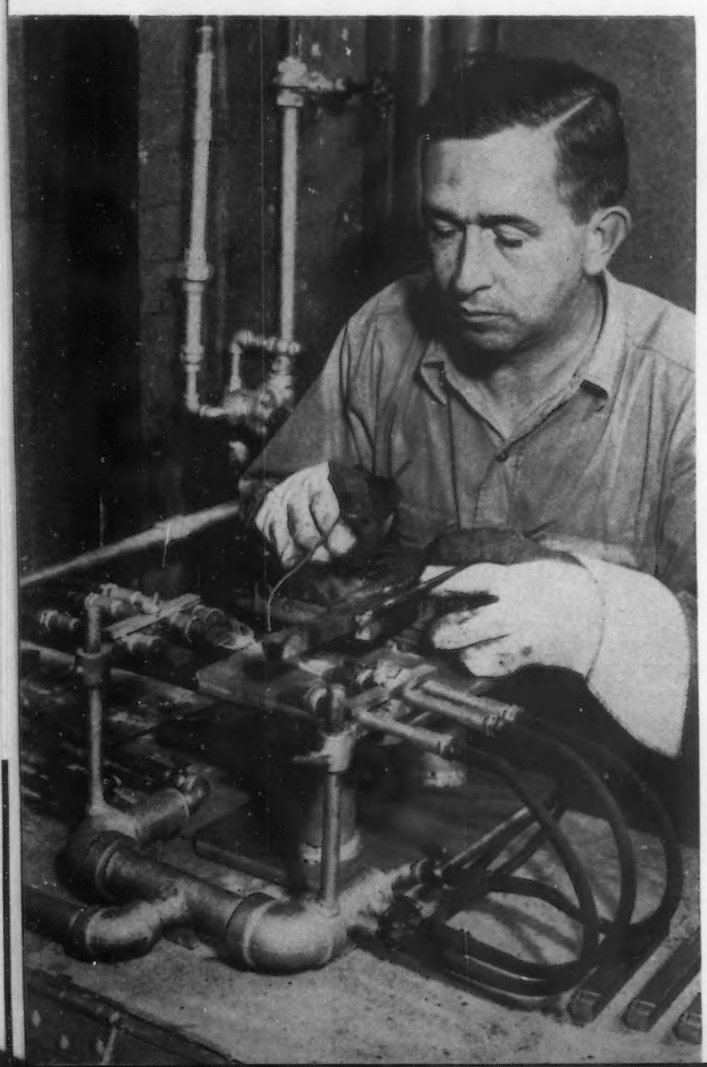
In the reclamation unit at Linhart, more than 1,000,000 lb. of various metals are handled each month. Much of this total requires no processing but merely proper segregation in order that it reenter the scheme to the best economic advantage.

Buick Makes Its Own Carbide Tools

HELPING to speed its production of defense items such as aircraft engines and parts, Buick Motor division has eliminated virtually all delays incident to obtaining special tungsten carbide tools from tool manufacturers by producing such cutting tools—at a claimed saving in cost—in its own plant at Flint. These tools are produced by brazing standardized sizes of carbide tips to shanks of SAE 1340 steel. While the carbide tips themselves are readily obtained from producers of tungsten carbide, the possibility of delays in obtaining complete tools is thus avoided by Buick.

Furthermore, in developing its carbide manufacturing program, Buick—through the G. M. Standards Committee—found that all of its different carbide tools, for all classes of work, could be produced from eleven different sizes of carbide tips—thus simplifying materially the problem of tip inventory.

Steel shanks first are ground to size on all four sides from hot rolled stock on wet surface grinders. From here they go to the milling department where the recess for the tip is milled out and the shank is stamped. The tip itself is polished on bottom and contact sides with a diamond wheel.



For brazing, Buick has also developed an unusual setup which not only permits the use of city gas instead of the usual oxy-acetlyene torches or electric furnaces, but is also one of the fastest tool brazing setups ever developed. The brazing equipment, illustrated, consists of a fixture having a flat top, on the back of which have been attached six fishtail gas tips—arranged in such a position that the tool held in a special vise, can be slid into position between three flames on each side. The vise itself rests on the flat surface of the fixture. The operator thus has both hands free with which to handle the tip and brazing material to assure getting a good braze. While one tool is heating the operator prepares another tool for the vise. City gas is mixed with air through a venturi tube at each one of the jets. Adjustment of the tips regulates the heat.

Tool shank and tip are first cleaned by dipping in carbon tetrachloride. "Handy" flux and Easy-Flo No. 3 solder are then applied, the tool is clamped in the vise and the tip is placed in position in the milled recess and covered with flux to prevent oxidation. The assembly is then slid forward, bringing the lower part of the tool shank into contact with the flames, thus avoiding direct contact of the flames with the tip. The brazing end of the shank is brought up to even soldering temperature of about 1400 deg. F.

As the tool heats up and approaches a cherry red, Easy-Flo No. 3—3/32-in. brazing wire is brought in contact with rear of carbide tip and allowed to flow under and around the tip. By means of a 3/16-in. rod with sharpened point, excess solder and entrapped air is removed by moving tip back and forth in recess of tool shank. The operator then brings the fixture back away from the flames and holds the tip firmly into the recess while it cools to a point where the brazing material solidifies. This is at around 1175 deg. F. At this point he removes the tool, dissolves the flux in hot water and passes on to the next one.

When the tool is cool it is shot-blasted and goes into temporary stock as a "milled and brazed" tool. From this stock it is drawn out for finishing of the profile of the tip to the required final shape in one of the numerous grinding rooms or service departments throughout the plant.

New Die Casting Machines

RESULTING from the increased use of magnesium, aluminum, copper and other non-ferrous die cast parts going into aircraft and other military uses, new developments in die casting equipment, procedure, and techniques are being brought out almost daily.

The Phoenix Machine Co., Cleveland, recently announced new Lester-Phoenix die casting machines, which for the past year have proved very efficient in the production of aluminum, brass, and magnesium die castings for airplane parts, where each casting must be X-ray inspected for porosity and casting defects. Rejections of parts made by this machine have been less than 1 per cent.

Casting density is achieved by high injection pressure of 22,000 lb. per sq. in., sustained throughout the injection stroke. This pressure is created by a self-contained hydraulic system, confined within the die by a die "squeeze" of 400 tons. This die "squeeze" is accomplished by hydraulically actuated double toggle linkage and cam locks within a rigid, non-elastic cast steel frame. The minimum section of these beams in the frame is 5 x 8 in.

The rigid frame requires an internal adjustment for die thickness, accomplished by a large central screw actuated by a worm and worm wheel through a single hand crank. Die plates are parallel, die space is accessible, and set-up time is greatly reduced. Electric timers permit exact duplication of any selected casting cycle.

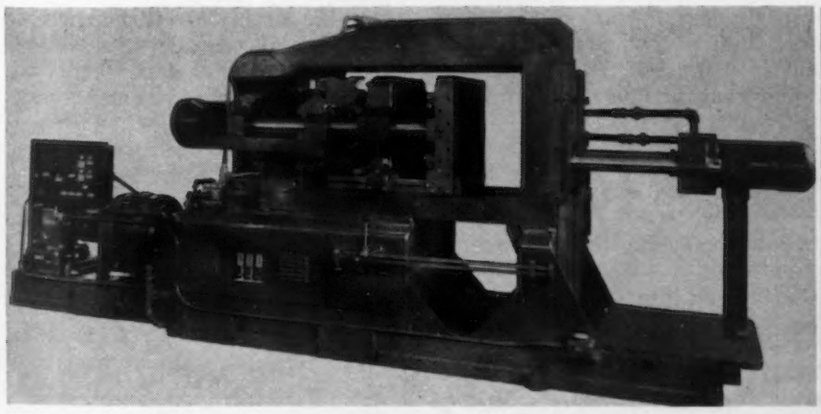
The Burroughs-Kahn die caster, model 200, built by Burroughs-Kahn Co., South Bend, Ind., is especially adaptable to the production of small and medium size zinc base die castings. Castings with surface areas as large as 20 sq. in., and weighing several pounds, are easily cast, and the machine can inject 4½ lb. of metal per shot. Small castings that do not require exceptional finish can be produced at the rate of from 350 to 400 per hr., while larger castings with thick sections and possibly several cores run as low as 100 per hr.

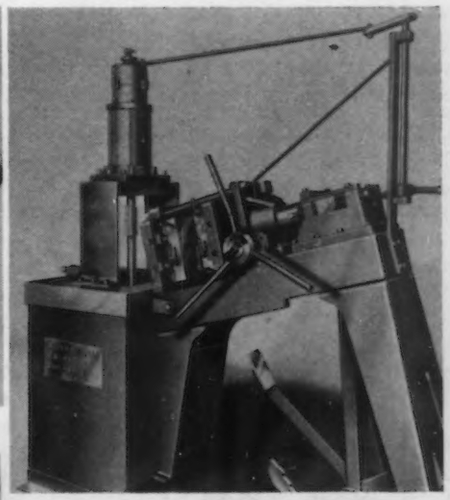
This die caster lends itself equally well to long or short runs. The fast changing of dies while the machine is hot makes it economical to run as few as several hundred pieces. Side, angle, front and back cores, as well as internal and external threads are all within the scope of this machine.

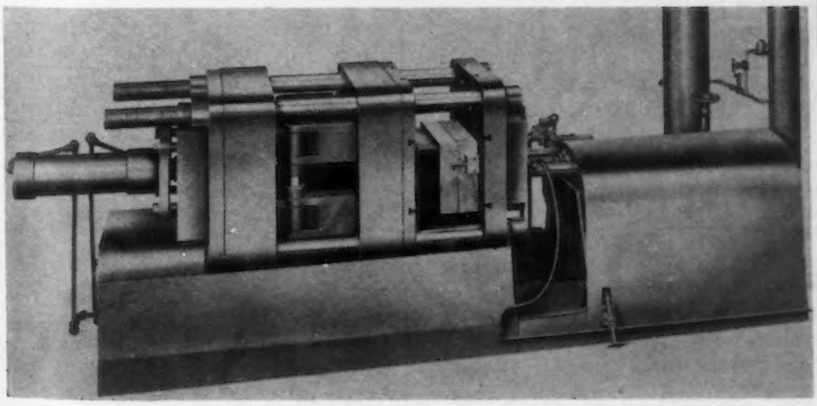
As a means of speeding production of die castings, the Harvill Aircraft Die Casting Corp., Los Angeles, announced that the new Harvill machine, as well as techniques and production methods pioneered by the Harville organization, will be offered to other companies.

Three sizes of this machine are available, the largest for dies with overall size of 21½ x 40 in. Each machine is equipped with accessory equipment such as an alloying furnace, holding furnace, ladles and pyrometer control equipment.

The Harvill firm is credited with developing die casting machines and processes for die casting aluminum, magnesium, and copper base alloys that result in castings with very high physical characteristics. For instance, aluminum castings from these machines have tensile strengths in excess of 38,000 lb. per sq. in., with over 3 per cent elongation, permitting their use for many structural parts that formerly had to be fabricated.







ABOVE

THIS is the new Lester-Phoenix die casting machine for cold chamber injection of aluminum, brass or magnesium, built by the Phoenix-Machine Co., Cleveland.

UPPER LEFT

THE Burroughs-Kahn die caster is especially adaptable to the manufacture of small parts, and can be run at speeds as great as 350 to 400 shots per hr.

LEFT

THIS Harvill Super Hi-Pressure die casting machine produces castings 35 x 10 x 6 in., in size at the rate of 150 per hr.

Silicon Bronzes for S

IN the present economy of emergency, tin will soon be one of the scarce materials and the problem of substituting some other material for it wherever possible will gain in importance.

A field where tin is used to a considerable extent is that of bronze castings, where the amount of tin runs broadly about 5, 8, 10, 12 and 17 per cent. Compositions of 12 and 17 per cent tin are used for bearings where a very low coefficient of gliding friction is important. For such use, tin is a most unique material and hardly can be replaced except by indium, the price of which is still beyond any foundry's reach.

In compositions containing 5, 8 and 10 per cent tin, as in red brass, valve bronze, and gun metal, the tin content is not so irreplaceable. True enough, many such castings are made of refined secondary metal, from which it does not pay to recover tin, so it must stay there and be used over and over again. However, a considerable amount of tin goes into the making of virgin ingots and it would be worth while to reduce that. On the other hand aluminum is still scarcer, and under present conditions manufacture of aluminum bronze will be limited, so these bronzes cannot be considered as an economic substitute for tin bronzes. Aluminum-bronze castings have always cost much more than the regular bronzes.

Two elements loom as desirable substitutes. One is antimony. Even 4000 years ago ambitious metallurgists, just graduated from the cave-in-the-wood college, tried to use this instead of tin because it was more readily available, but met with very little success. Nevertheless, there are indications that antimony bronzes with about 7 per cent antimony are by no means worthless if properly cast and annealed. Their elongation is low, just a few per cent in 2 in., but the hardness is higher than in gun metal and the strength about the same as of red brass. At any rate the idea of using antimony bronzes is still an infant, perhaps only a still-born one. Far more advanced and actually in use is the idea of silicon bronzes.

Silicon bronzes also were plagued with an undeservedly bad reputation until Jacobs of the DuPont Company decided to give them a fair trial and developed his Everdur. And, as is usual, soon a number of competing compositions were discovered and patented. Of these, the sand casting industry can be interested only in the "PMG" alloy developed by Vickers Co., and the "Tombasil" developed in Germany.

Tombasil, meaning a silicon containing tombak, low zinc brass of 10 to 20 per cent zinc, was described by Vaders, its inventor. Herein, attention will be directed to two silicon alloys only: the Everdur with its 4 per cent silicon and 1 per cent manganese,

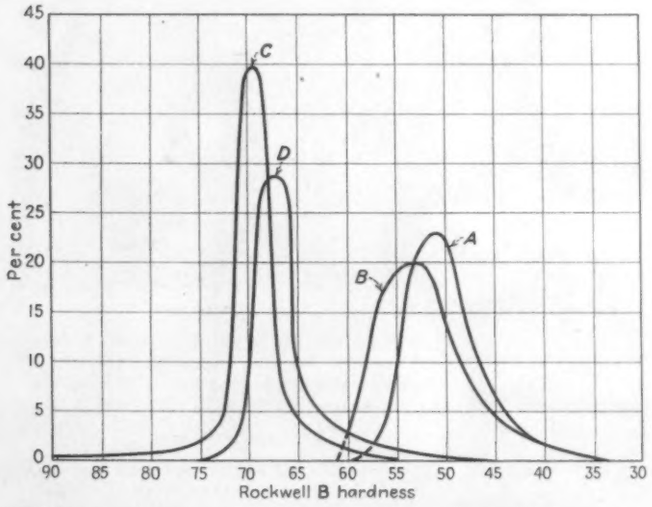


FIG. 1—Hardness frequency curve of Rockwell B readings in Everdur and PMG alloys and castings. A—Everdur surface hardness. B—Everdur cross-section hardness. C—PMG metal surface hardness. D—PMG metal cross-section hardness.

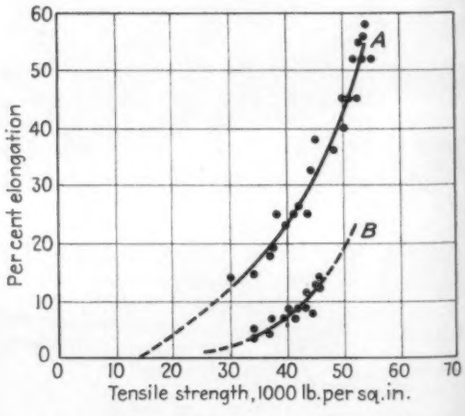


FIG. 2—Relationship between tensile strength and elongations in Everdur (A) and PMG metal sand castings (B). The dotted parts are extrapolations, appearing to indicate that the yield point in both alloys is close.

Sand Castings

By M. G. CORSON
Metallurgical Consultant, New York

. . . With tin supplies getting scarce, foundries will be searching for substitutes for this metal in castings. Here, the substitution of antimony and silicon for tin in castings is discussed, with inherent advantages and disadvantages of these substitutes.

and the PMG with 4 per cent silicon and 2 per cent iron.

Everdur

Density: A good casting in Everdur must have a specific density of 8.37 to 8.40, quite a narrow range. A lower density will mean gassiness or shrinkage which in Everdur is rather unevenly distributed. A higher density means a deficiency of silicon. In both cases all mechanical characteristics are lowered. However, proper density is not a decisive factor. Since the two fundamental factors work in opposite directions, they may check each other so that the density appears quite right. Therefore, the density must be checked by the determination of hardness.

Hardness: To test the hardness of castings in Everdur, only the Rockwell B scale is of value. The old Brinell integrates for too large a region and is, therefore, not sensitive enough, and if it is necessary to go from the Rockwell B to the E scale it likely means that the castings are no good.

But even an excellent casting is not uniform in hardness. Too many factors interfere, among which may be porosity, silicon segregation, the local appearance of the kappa phase and a partial spontaneous hardening by the precipitation of manganese silicide. The range of the B readings is from 62 to 30 even in the best castings, so a few perfunctory readings will not do at all. Many observations must be taken before a judgment can be passed.

Curve A in Fig. 1 shows the frequency of various readings taken on the surface of a heavy cast bar. It shows that the maximum number of readings will be around 52 and if the readings do not deviate from this value downwards it is fairly certain that the casting is good, provided the density is not above 8.40.

If for some reason it is necessary to check the hardness in a cross-section, it is possible to use curve B, which shows that in the deeper layers, except at the very core, the hardness is higher. The best average is 53, but a considerable number of readings will go to 58 or so. If there are many readings below 53, the casting must be considered suspicious.

The tensile strength of the arbitration test bar may be very high. It may reach 55,000 lb. with 60 per cent elongation, which is very close to the characteristics of the wrought and annealed alloy. But the strength of a large casting may differ widely in its different regions. Fig. 2 gives the distribution of tensile strength and elongation in a square bar about 2.75 in. thick. It may be observed that the values run rather symmetrically. At the corners of that bar the average values were 51,000 lb. per sq. in. and 45 per cent elongation; in between, 40,500 lb. per sq. in. and 23 per cent elongation; at the core, 30,000 lb. per sq. in. and 14 per cent elongation. The average for the whole casting might be 44,000 lb. per sq. in. and 32 per cent elongation.

Between tensile strength and elongation there appears to be a definite relationship, as shown in Fig. 3. It is likely that a bar which breaks at 15,000 lb. per sq. in. will have no elongation whatsoever and that is very close to the value of the yield point, which does not change much from a good casting where it is about 16,000 lb. per sq. in. to a very poor one with 13,000 lb. per sq. in. for yield point, but only 34,000 lb. per sq. in. for strength.

The drawback of Everdur in comparison with tin bronzes is that it has practically no proportionality limit, that is, suffers permanent deformation at a very low load or impact. The maximum proportionality limit is 5000 to 6000 lb. and it does not change appreciably from a good casting to a poor one.

The grain size of cast Everdur is of no importance. Fig. 4 shows the macrostructure of a very poor bar. A really good one had much larger grains and a mediocre one had a grain size about half of that shown.

Good micrographs of Everdur are hard to prepare. It is almost impossible to polish the sample without scratching the surface by the tiny crystals of manganese silicide which are rather hard and only loosely held. However, an interesting structure is obtained on deep etching, as shown in Fig. 5. It is possible to discern small grains of the silicide from which veins depart in the diagonal directions forming a very simple pattern. It looks as if there were a regular precipitation of rather heavy fibers of the silicide between the primary crystallized granules.

No doubt good sound castings of Everdur can be produced for nearly every purpose where tin bronzes are used today. But the machining of Everdur is quite a

different thing, because it drags just as badly as pure copper does and does not machine as easily as common brass. Also it does not take a good polish and does not tin as well. On the other hand, its welding characteristics are good, something that cannot be said of tin bronzes. Machining cannot be improved by the use of lead, but tellurium or selenium additions probably can be used to advantage.

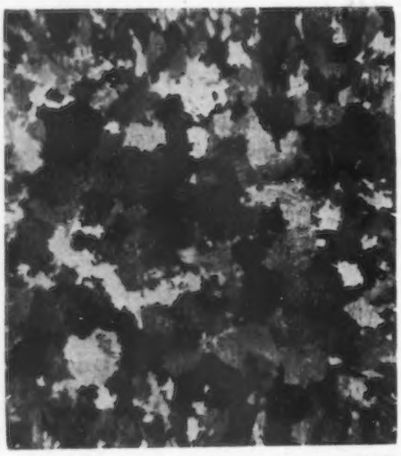
	PMG			EVERDUR		
Tensile Strength	45.0	39.2	45.4	53.0	43.5	50.0
Elongation	12.5	7.0	12.0	55.0	25.0	40.0
Tensile Strength	41.4	34.0	44.0	37.2	30.3	39.5
Elongation	9.0	4.0	8.0	18.0	14.0	23.0
Tensile Strength	45.5	36.9	42.9	50.2	42.1	50.5
Elongation	14.0	7.0	9.0	40.0	26.0	45.5

FIG. 3—Distribution of tensile strength and elongation through the bodies of heavy castings in PMG and Everdur.

PMG Metal

Density: PMG densities are practically identical with those of Everdur, except that they should be about two points higher, between 8.39 and 8.42. A PMG casting with 8.32 density is quite inferior. **Hardness:** The hardness of PMG is considerably higher and more uniform than that of Everdur. Curve C in Fig. 1 shows the frequency of various hardness readings over the cleaned surface of a cast bar 2.75 in. across. The most frequent reading is 69 Rockwell B and the little deviation from this figure is mostly upwards. The cross-section, curve D, however, is softer, contrary to that of Everdur. Here 67 is the average Rockwell B and deviations toward lower values become more frequent. The core, of course, must be excluded.

Mechanical characteristics of PMG are different from those of Everdur. The reason is that the 2 per cent iron removes at least 0.3 per cent of silicon from the solid solution, so reducing the content of the latter to about 3.7 per cent, perhaps 3.6 per cent. A well cast arbitration bar is likely to show 50,000 lb. per sq. in., with 48,000 quite common, but a heavy casting like a square bar 2.75 in., across will not go as high. The tensile strength at the corners will be 45,000 lb. per sq. in. with 15 per cent elongation, and 40,000 lb. per sq. in. with 8 per cent elongation; for the core a strength of 34,000 lb. per sq. in. and an elongation of 4 per cent are most likely; the average for the sound part of the bar being 44,000 lb. per sq. in. as in Everdur, except that the elongation is much lower, only 11 per cent. The proportionality limit is 6000 to 8000 lb. per sq. in. and the yield point about 16,500 lb. per sq. in., so there is but little difference between it and Everdur. However, PMG tends less to absorb gases than Everdur, and good castings are easier to get.



The machining characteristics of PMG are considerably better because of the stringers of the iron carrying granules and of the kappa phase which is always present in PMG. These factors reduce the plasticity of the metal in comparison to Everdur, hence the lowered elongation values.

Samples of PMG polish much better than Everdur and etch more evenly. Fig. 6 shows the structure of this alloy. The larger islands of indefinite delineation are formed of the kappa phase. Around it the alloy shows a network of triangular striation as if it were strained or contained filaments of a precipitate. The stringers of the iron-silicon phase are

ABOVE

FIG. 4—Microstructure of a sand cast bar of Everdur alloy.

° ° °

RIGHT

FIG. 5—Microstructure of a deep etched sample of Everdur, enlarged to 100 diameters and etched with ammonium persulfate.

FIG. 6—Microstructure of sand cast PMG alloy, at 100 diameters. The large, bright islands of indefinite delineation are formed of the kappa phase, the iron bearing phase. A triangular striation is seen around each island of kappa.

FIG. 7—Microstructure of sand cast PMG alloy, enlarged to 500 diameters.

quite distinct, but their distribution is not too regular.

The impact characteristics of PMG are comparatively low, from 14 to 17 Izod whether the cast bar is of superior tensile strength or not, and do not depend on the position in the casting. This cannot be said of Everdur for which the Izod values are definite indications of soundness. In Everdur a sound bar will show over 60 ft.-lb. Izod and this figure will drop to 30 ft.-lb. when the strength drops to 40,000 lb. per sq. in.

New Gage Measures Machine Strain

A NEW type of electro-magnetic gage to measure the strain on machine parts subject to sudden loads has been developed by H. P. Kuehni of the General Electric Co., Schenectady.

In some types of machines, such as punch presses, shears and press brakes, the strain during a cycle of operation occurs for a very short period of time, rising abruptly to the maximum and then falling sharply to zero. It is this kind of machine for which the gage has been developed as a protective device to prevent overload with consequent breakage.

The gage can be connected to give more than one kind of indication. A direct value of the maximum strain can be obtained from an instrument in front of the operator, or a light or bell can be attached to give a signal when a predetermined amount of strain has been reached. The gage need not be applied directly to the vital part of the machine under strain, but may be applied to any part of the machine whose stress represents the equivalent stress on the vital part.

The gage, made up of a rod, lever arm and head, looks like a side view of an automobile jack when attached to a machine. The handle is the gage rod, the jack is the lever arm, and the base is the gage head. Either end of the rod is fastened to the machine in the direction of the strain. The lever arm, attached at its outer end to the machine, is at right angles to the rod. The gage head is mounted on a plate that also is attached to the machine at a point on a line with the lever arm. The gage head consists of an armature operating two coils.

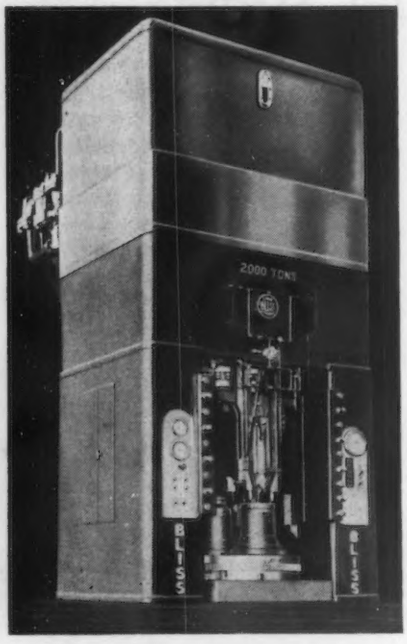
Before the job is started, the position of the armature within the coils is adjusted to a zero reading on a connected instrument. When the machine is put into operation and strain exerted, the rod pulls down on the lever arm. The arm in turn pulls down on a pin in the armature and moves the armature to a new position within the coils, effecting a change in the electromagnetic relationship between the armature and coils in accordance with the amount of strain exerted. The instrument, previously calibrated against known strain loads, indicates the extent of the unknown strain.

New Equipment . . .

Presses

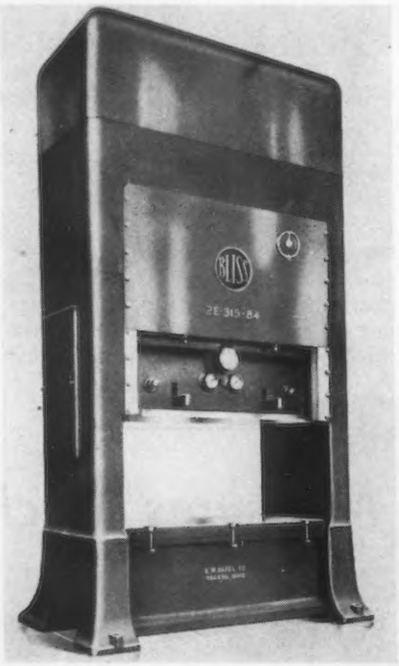
Improvements and new developments in presses, press accessories, riveters, punches, shears and other similar equipment are detailed this week. Many developments have been made specifically for use in armament and war machine manufacture.

HYDRAULIC heading presses of 1500 and 2000-ton capacity for cartridge case heading work have been added to the line of presses built by *E. W. Bliss Co.*, Brooklyn. These new sizes, available in the mechanical knuckle joint type or hydraulic design, are of a four-piece frame construction with side housings keyed to the crown and bed, and with the tie rods shrunk so that the press frame is preloaded. The ejector is of 38 tons capacity, and the press has a two station lower dial pneumatically driven and equipped with hydraulic dash pots to eliminate shock in stopping. The press slide has a two station punch holder, and the press has a fully automatic cycle, covering dial, press, punch slide and ejector operation. This automatic operation may be arranged for either one or two pressings per case, with independent pressure control.



Two Point Press

E. W. BLISS CO., Toledo, Ohio, has announced a two point enclosed type, 315-ton press, 84 in. between uprights with double gearing running in an oil bath. The press is of four piece tie rod construction. The crown, bed, slide, and uprights are steel castings, and the press is furnished with a hydraulic friction clutch, hydraulic brake and an air counterbalance.

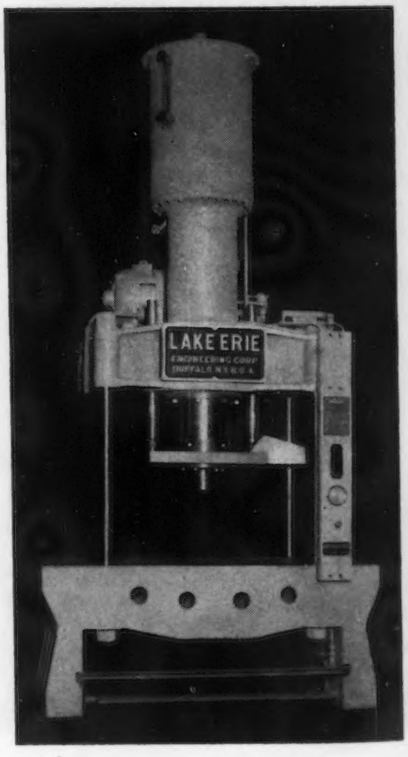


125-Ton Hydraulic Press

A NEW 125-ton, industrial hydraulic press has been announced by the *Bee-Line Co.*, Davenport, Iowa. The press is mounted on a movable roller bearing carriage, permitting application of pressure at any point on the 84 x 34 in. bed. The jack carriage can be raised or lowered 16 in. with a minimum space of 2 in. between the ram and bed and a maximum space of 28 in. The ram travel is 10 in. The jack has a three speed, hand operated pressure pump, and the overall size of the tool is 8 ft. x 4 ft. 8 in.

Armor Plate Straightener

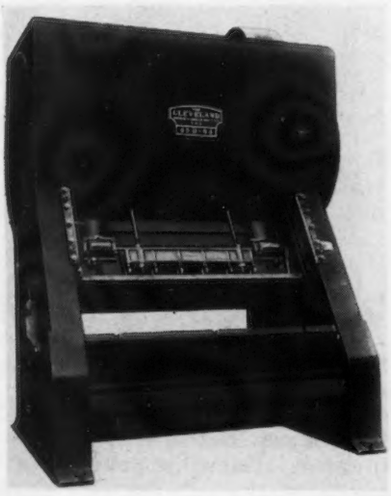
A 100-TON hydraulic press for straightening light armor plate and bars was announced by the *Lake Erie Engineering Corp.*, Buffalo. Close control of pressure provides an ideal means of straightening plate that is distorted or warped from heat treatment. The press is self-contained



with the pumping unit on top. It is accessible from all four sides for speed and convenience in handling material.

Crank Press

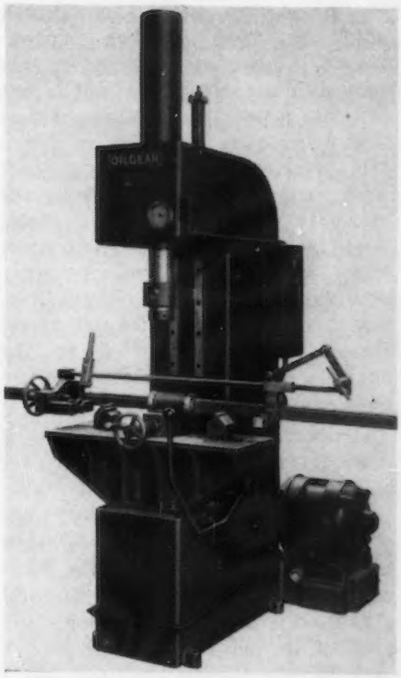
CLEVELAND PUNCH & SHEAR WORKS CO., Cleveland, recently introduced a straight sided, double crank press, single geared and equipped with an electrically controlled, hydraulically operated friction clutch and brake. Of four-piece, tie rod construction, the press has an automatic single roll feed, hydraulically operated, for feeding material 13/32 in. thick x 2½ in. wide, right to left across the dies. A 30 deg. incline provides gravity discharge of finished pieces into tote boxes at the rear of the press. The unit is designed with a box type crown, eliminating overhanging gears and projections.



Gears run in an oil bath and the slide, which may be spring or air counterbalanced, is arranged for hand adjustment. The slide has a 3 in. stroke, 3½ in. adjustment, and operates at the rate of 45 strokes per min. The bed area is 30 x 84 in., and the press capacity is 150 tons.

Gooseneck Press

SEVERAL new styles of gooseneck presses in capacities from 6 to 25 tons with controlled ram pressure, speed, and travel for forcing, stamping, broaching, assembling, straightening and general manufacturing has been introduced by the *Oilgear Co.*, Milwaukee. These presses have rigid, all-steel, welded frames with integral pumps and motor reservoir bases; ring



type pistons; honed steel cylinders, large, ground and polished rams guided in bronze liners; direct reading pressure gages; and many other salient features. Two styles of standard sensitive controls are available on these presses. The first, a servo-motor hand lever and foot pedal mechanism provides sensitive control of the variable ram speed. Top and bottom limits of ram travel can be preset for repetitive cycles. The other control is a servo motor follow-up lever mechanism that provides high speed approach for a preset ram travel at a speed and distance selected. Special controls are also available on this line of presses.

Automatic Press

A NEW high speed automatic press has been developed by the *Diebel Die & Mfg. Co.*, 3654 Lincoln Avenue, Chicago, to meet the demand for a small, rigidly built punch press to handle small metal, fiber, and similar stampings. The Diebel press has speeds from 180 to 500 strokes per min., the feeding mechanism being built into the press. The machine handles strip or coil stock and has shown savings in die maintenance cost because of its construction, which assures perfect die lineup.

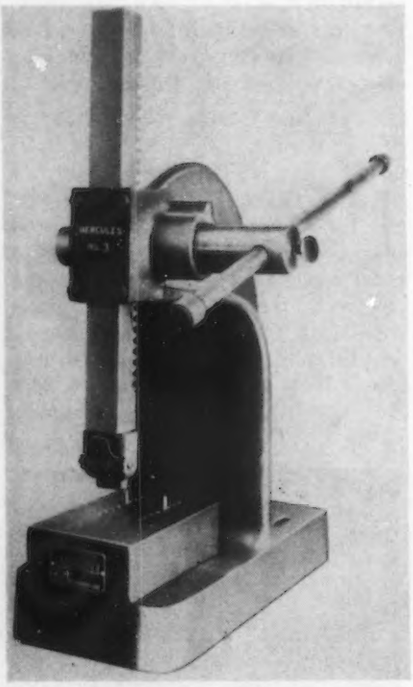
Light Presses

IMPROVEMENTS made in the line of hydraulically operated Junior presses built by the *Colonial Broach Co.*, 147 Jos. Campau, Detroit, include increased platen depth of 1½ in., increased throat depth, and increased base dimensions from 14 x 22 in. to 17 x 24½ in. By the use of special coolant

equipment, light broaching can be done on the machines. A four-way, manually operated valve controls the ram stroke, permitting automatic return. The ram operating cylinder is integral with the machine column, and the ram has an operating speed of 30 ft. per min., with a return speed of 60 ft. per min. An adjustable pressure relief valve permits ram pressure adjustment, and provision is made for the installation of a pressure gage. Two models in this line of presses are made in 1 and 1½-ton capacities.

Marking Press

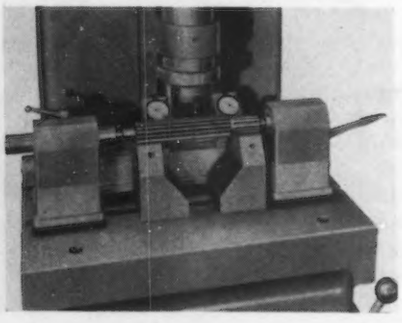
A NEW stamping outfit for stamping numbers into defense parts has been designed by the *Acromark Corp.*, Elizabeth, N. J., and has found wide use for numbering name plates, tool checks,



badges, metal or fiber identification tags, gears, and other items. The outfit consists of a precision constructed arbor press with a square ram that insures straight up and down movement. The ram is fitted with a press style type holder, and the stamping block is cast iron machined and finished smooth and parallel to the type face. Guide pins facilitate locating the mark on the part to be stamped.

Straightening Attachment

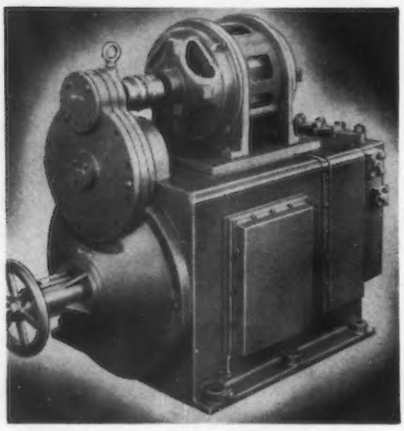
TO correct small irregularities in short, hardened steel shafts, the *Denison Engineering Co.*, Columbus, Ohio, evolved a special tooling for their standard, 15-ton C-type hydraulic press. With



the press ram raised, an unalined shaft is fixed between centers. Gages, calibrated in 0.001 in., are moved along the shaft until they indicate a point to be straightened. The press ram, operated by a control lever, advances to the shaft and centers are lowered with the shaft to the straightening block. Additional movement of the control lever applies the pressure that straightens the shaft. Gages then measure the shaft before it is released. Tonnage applied to the shaft is in direct proportion to the movement of the control lever.

Press Pump

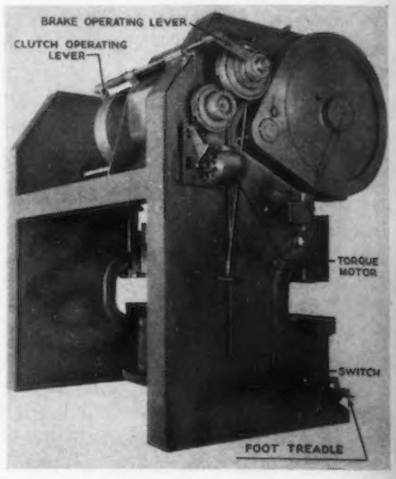
A NEW, variable delivery, high pressure pump has been built by the *Watson-Stillman Co.*, Roselle, N. J., with an infinitely variable flow from 0 to 6 gal. per min., at 5000 lb. per sq. in. pressure. A new driving member trunnioned on



the drive shaft accomplishes this, and its angle can be varied while the pump is running to produce a stepless change in plunger stroke from 0 to the full 4 in. stroke. Especially adaptable in hydraulic press applications where a rapid advance must be followed by a slow movement at high pressure, the pump is equipped with a 25-hp. motor and weighs 5000 lb.

Press Clutch and Brake

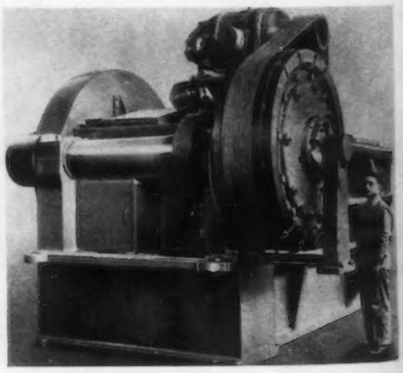
A NEW, electrically operated clutch and brake mechanism for steelweld bending presses has been developed by the *Cleveland Crane & Engineering Co.*, Wickliffe, Ohio. The mechanism is set into operation by depressing a foot treadle, which switches on a torque motor. Through a toggle, a shaft connecting the clutch and brake operating levers is worked by a connecting rod from a gear segment driven by the torque motor. When power to the motor is cut, a heavy spring on the clutch-brake



connection shaft applies the brake, stopping the machine in case of power failure. Alternate depressing of the treadle causes the brake or the clutch to be brought into action. This power device is particularly desirable for larger machines used for forming plate ½ to 1 in. or more thick.

Press Clutch

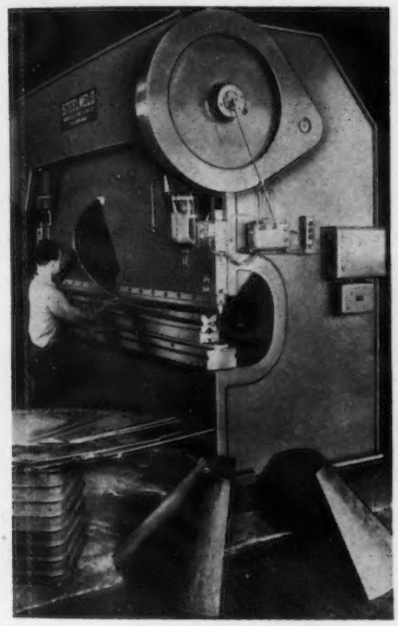
A RECENT improvement incorporated in all forging machines and presses built by the *Ajax Mfg. Co.*, Cleveland, is the double-draft ventilation that greatly increases clutch efficiency. Air in great volume is pulled in by scoops on the hubs on both sides of the flywheel, forced out centrifugally between the friction surfaces of the clutch plates, and discharged through openings in the outer clutch housing, just inside the flywheel rim. The double-draft provides ample cooling throughout the clutch, prevents excessive heating at highest frequency of engage-



ment, and prolongs the life of the friction surfaces. The clutch is housed within the flywheel which is mounted between widely spaced anti-friction bearings so there are no overhanging torque loads.

Tapering Attachment for Brake

BENDING presses made by the *Steelweld Machinery division* of the *Cleveland Crane & Engineering Co.*, Wickliffe, Ohio, are now being furnished with a ram-tapering mechanism that enables the manufacture of conical sections without the use of special dies. To



taper the ram it is only necessary to operate the ram-tapering lever which disengages the ram clutch. This permits operation of the right hand ram screw only, which raises or lowers the right end of the ram, producing tapering. Either end of the ram can be tapered as much as ¼ in. per ft. The ram swivels on trunnions in the slides so there is no cramping on guides or bearings.

Power Squaring Shears

ADDITION of two new power squaring shears, series Nos. 6 and 7, built in 4 to 12 ft. cutting lengths and capacities from 12

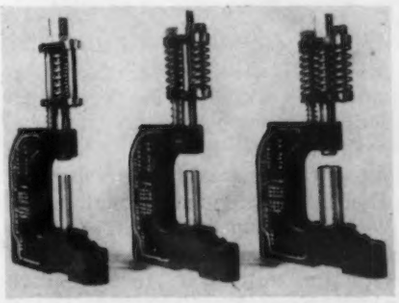
gage to 3/16 in. and from 10 gage to ½ in. have been announced by the *Niagara Machine & Tool Works*, Buffalo. The shears are of underdrive design, with the drive operating in an oil bath. A new degree of accuracy, resulting from advanced design, provides straight shearing to within a few thousandths of an inch without camber or curl. The No. 7 shear operates at a speed of 60 strokes per min., and the No. 6 at 65 strokes per min.

Tube Bender

THE PINES ENGINEERING CO., Batavia, Ill., has developed a high production, air operated tube bender, claimed capable of producing an average of 250 bends per hr. on 1 in., 16 gage tubing, using a mandrel. The mandrel, assuring smooth bends, is available with either a mechanical or air-operated device for pulling it from the bent tube in the event that it sticks. One complete set of bending dies of a specified size is standard equipment with each machine. Dies are actuated by the piston rod of an air cylinder, specially constructed for this service. The cylinder is controlled by a solenoid-operated, poppet type, four-way air valve, the arrangement making possible very short air lines and reducing to a minimum the amount of air required for the operation. The solenoid valve is controlled either by a foot switch or a push button.

Punching Die Strippers

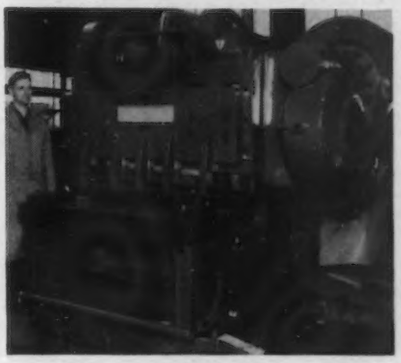
SELECTIVE strippers with three instantly removable and interchangeable springs that provide a tension selection for the exact



stripping action required by various gages and types of metal have been developed by the *Strippit Corp.*, Buffalo, for use with Wales hole punching dies. The new selective stripper gives perfect stripping control, and in addition makes possible the punching of 5/16 in. holes on ¾ in. centers. Simplicity of design of selective stripping makes metals changes of pressure practically instantaneous. Lighter gage can be punched on smaller, more economical presses by eliminating unnecessary high spring pressure.

Rolling Mill Shear

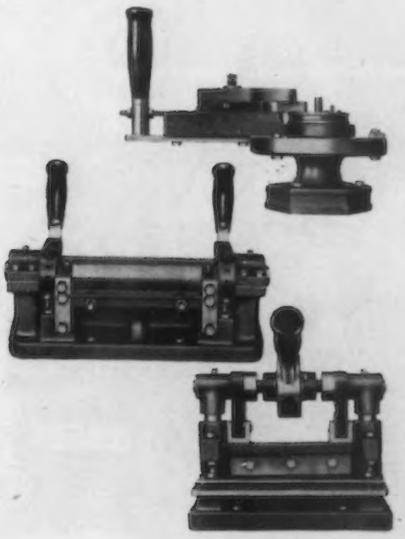
THE CINCINNATI SHAPER CO., Cincinnati, recently announced its new 6204 shear for continuous mill cutting of brass,



zinc and other metals. Capable of cutting sheets or strip 4 ft. wide by 1 in. thick, the shears are of rolled steel plate construction with hydraulic holddowns and automatic lubrication, and operate at the rate of 30 strokes per min. These units weigh about 40,000 lb.

Metal Forming Tools

THE O'NEILL-IRWIN MFG. CO., Minneapolis, recently announced two useful metal forming tools, a bender and a brake; and a metal shear. The Di-Acro bender and brake are designed primarily to duplicate and form many vari-



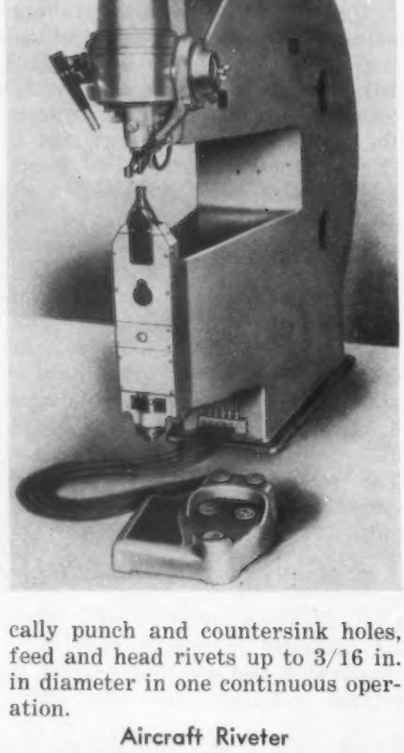
eties of metal pieces, substituting for blanking and forming dies or die sets. The Di-Acro shear will cut, slit, or notch all ductile metal materials including spring tempered metals, and can be used for plastics, bakelite, rubber, and leather. The tools operate to very close tolerances, and are economical and fast. The bender will receive, without alteration to its design and without disassembly, shop made conversions for forming angle, channel, rod, round, hexagon, or square tube, round, square, half-round or flat wire, strip stock and any other ductile materials. The brake will form all types of metals within their ductile limits to intricate and complicated shapes and outlines, and make boxes without fingers or extra attachments. The bender and brake comes in two sizes and the shear in one size.

Hydraulic Riveter

AN improved hydraulic, portable riveter has been announced by the *Hanna Engineering Works*, 1765 Elston Avenue, Chicago, made in capacities up to 150 tons pressure. The unit is completely enclosed, has a ram pressure of 17½ tons with a 3 in. ram stroke, and will drive ⅜ in. rivets cold and ⅝ in. rivets hot. A push button on the riveter initiates the riveting cycle. The rivet die advances rapidly at low pressure until it contacts the rivet, and pressure increases as the rivet is driven. Reversal of the rivet die occurs the instant the rivet is driven and the return to starting position is rapid and automatic. Standard C-frame yokes are available in five sizes, ranging from a 4 in. reach with a 6 in. gap to a 12 in. reach with an 8 in. gap. Yokes are also designed for specific needs. A flexible suspension feature assures maximum operating speed, and rivets can be driven from practically any position.

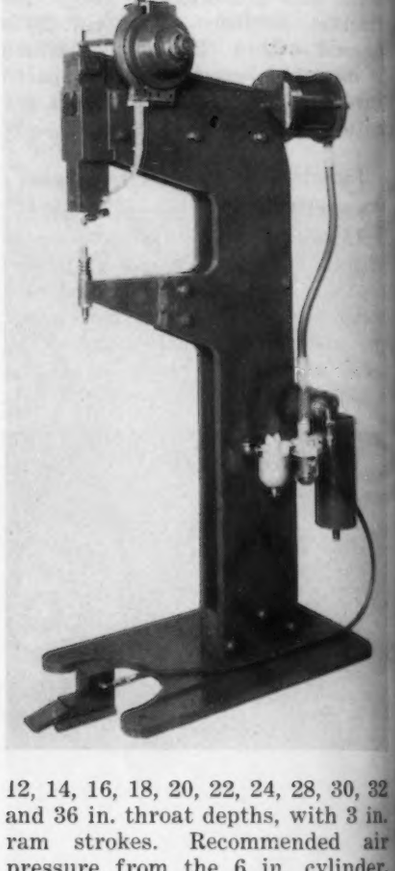
Punch and Riveter for Aircraft

A NEW model, No. 1002, airframe riveter has been announced by the *Engineering & Research Corp.*, Riverdale, Md., that has a 48 in. throat, C-frame, and is equipped with an air operated remote control and quick anvil drop operated by the same remote control. This riveter will automatically punch and countersink holes, feed and head rivets up to 3/16 in. in diameter in one continuous operation.



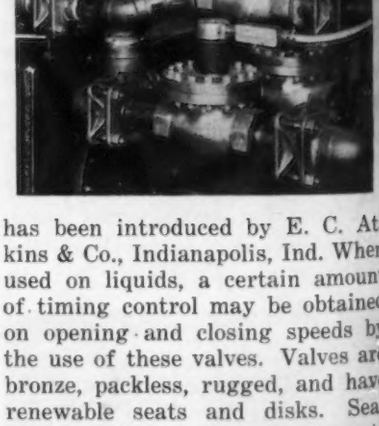
Aircraft Riveter

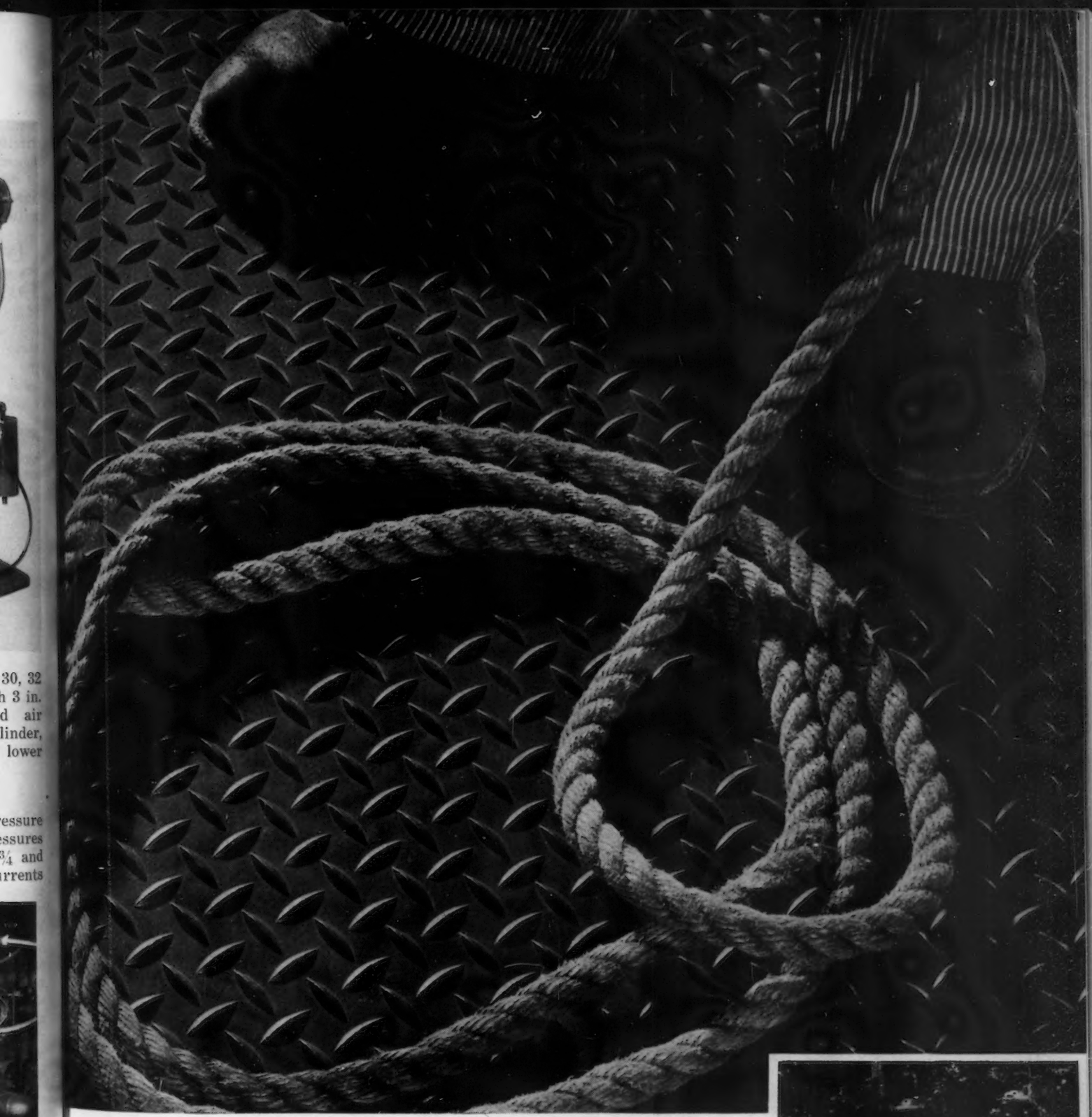
THE TOMKINS - JOHNSON CO., Jackson, Mich., recently announced a new type of production rivet setting machine for use in the aircraft industry. Pressure for setting rivets is furnished by air pressure, applied through a toggle mechanism. This air squeeze action is combined on this machine with an automatic feed feature which heretofore has been used largely on electrically powered riveting equipment. By using a different type rivet set and jaw construction, the machines will do a good job of flush riveting. The machines will set aluminum alloy rivets up to ¼ in. in diameter and ¾ in. long, and are available in 9, 12, 14, 16, 18, 20, 22, 24, 28, 30, 32 and 36 in. throat depths, with 3 in. ram strokes. Recommended air pressure from the 6 in. cylinder, is 60 lb. per sq. in., but lower pressures can be used.



Press Valves

A NEW line of high pressure valves for operating pressures up to 3000 lb., made in ½, ¾ and 1½ in. sizes for standard currents has been introduced by E. C. Atkins & Co., Indianapolis, Ind. When used on liquids, a certain amount of timing control may be obtained on opening and closing speeds by the use of these valves. Valves are bronze, packless, rugged, and have renewable seats and disks. Seat diameters can be furnished up to full pipe size, and bubble-tight pilot assemblies can be furnished for air and gas operation.





In the plants—in the tanks . . . U. S. Army tanks, rolling and rumbling to defeat the attackers of America, protect their crews against slipping and falling accidents with "A. W." Rolled Steel Floor Plate. It's the same skid-proof safety that speeds production wherever men work. With "A.W." Floor Plate, there are no slippery surfaces. Fire-proof, crack-proof.

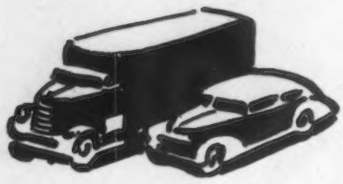
ALAN WOOD STEEL COMPANY

MAIN OFFICE AND MILLS: CONSHOHOCKEN, PA. District Offices and Representatives: Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, St. Paul, New Orleans, Pittsburgh, Roanoke, Sanford, N. C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal.

Photo by U. S. Army Signal Corps

Assembly Line . . .

• Kanzler's appointment as head of wartime auto industry moves automotive leadership back to Detroit . . . Here, more than in other industries, a series of committees has plagued the defense effort.



DETROIT—The capital of the automotive industry was moved back to Detroit last week when Donald Nelson, chairman of the new WPB, named Ernest Kanzler, almost forgotten here as an automobile man, as boss of the wartime auto industry, telling him to set up headquarters here with a first-class technical staff and to operate on a considerably sterner basis than that prevailing in recent debating sessions here and in Washington.

At the same time the industry was made a proving ground for wartime control of all industry. Events promise to move rapidly here in coming weeks, so the interpretation of news and current history of this particular industry takes on greater importance for other industries. What they see happening here may very soon establish the pattern and final form under which they, too, will carry on their war work.

Even from what has just happened to the auto industry in recent weeks, other industries can take a few tips. The best way to highlight the suggestions that arise from hindsight is to review briefly what has gone on in this industry.

FIRST of all, the whole national effort for 18 months has been plagued by committees. That's not news. Since the National Advisory Defense Commission was formed in 1940, a general complaint has been the one against indecision, confusion and lack of authority and accomplishment that was blamed on the lack of a real working organization, and the substitution of committee action, or inaction. The final passing of OPM supposedly marks the end of that sort of thing. Similarly, the auto industry has been plagued by committees, probably more so than other industries. Looking closely, you can see that there have been four or five committees in existence since the first of the year. One was standing on Jan. 1, as a hand-over from pre-Pearl Harbor days. On Jan. 5 there were two five-man committees named by OPM, one representing industry, the other representing Labor. The next day these two were made one in a shotgun ceremony—for a few hours—but this committee blew up and another one (the Ching group) took its place. This one faded when WPB replaced OPM.

AUTO CHIEF: Ernest Kanzler, former Ford production chief (below) was named by Donald M. Nelson, War Production Chief, to head the conversion of the automobile industry's production to war products.

Press Association Photo

Now there are no committees, just a boss named Kanzler.

Incidentally, the first of the committees named above was actually under OPA and was concerned almost entirely with civilian aspects —for instance, it directed its attention to curtailment of civilian auto output, but not to acceleration of military goods output, except that it sometimes had to refer to this subject in its concern over maintaining the level of civilian employment. The later groups were concerned with conversion of the industry to a wartime footing, but that was after Pearl Harbor, when the entire national outlook had been altered.

THESE later and more recent steps have been complicated by union, political and industry pressure activities, many of which could have been anticipated by the industry, but were not. In this, reference is made to such things as the dispute over the Reuther plan, the political potshots that have been taken at the industry in the past month, and the poorly informed public opinion that exists in the matter of defense production. It seems unlikely that any other industry will face exactly the same cycle of events, but somewhat general prospects do exist for all industry. Management might profitably review the fact that the auto industry does know now that it should have answered the Reuther plan effectively a year ago, should have told its own story of war work accomplishments even more completely to the public, and might have gained much if it had shed more public light on the fact that auto firms were continually seeking more war orders but could not get them because the services didn't seem to know what they wanted and were unwilling to speed up procurement. Moreover, it was a mistake not to have asked months ago just what plans did exist in Washington to meet the situation that is with us today. As it is, the industry is shouldering (in the public eye) a foisted blame. And is having some real trouble in setting itself straight again with the public.

For other industries there is a

Give your Taps a "BREAK" or they will BREAK

KEEP them in good condition by sharpening them frequently. Use dulls them as it does all cutting tools and when dull they are likely to chip, break and produce rough or oversize threads.

Here are some suggestions which will help you get utmost service from your taps:

1. The minute a tap begins to get dull, sharpen it.

2. Take light grinding cuts to avoid "burning" the cutting edges.

3. Use a tap chamfer grinding machine, if possible, as it reproduces the original grind accurately. There are several good ones on the market. If you must grind by hand, note the following:

a. As a rule, grind the chamfered portion only. (Note the diagrams which show correct results of grinding and—exaggerated—two common errors.)
b. Have a new tap handy for comparison regarding number of threads chamfered.
c. Use a soft 80 grain wheel.

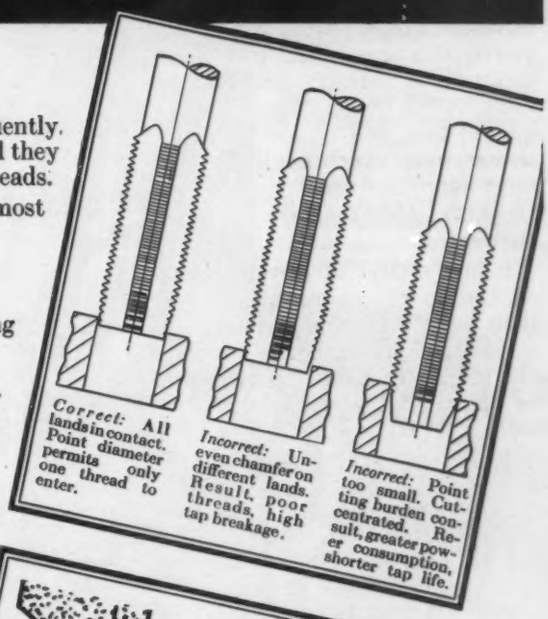
4. If tap needs grinding in flute, to touch up the edges, use a universal grinding machine and a hard 60 grain wheel. Use a saucer wheel for a radial or straight rake and a disc wheel formed to the hook for a hooked rake. (Note the sketches which show how to handle this job.)

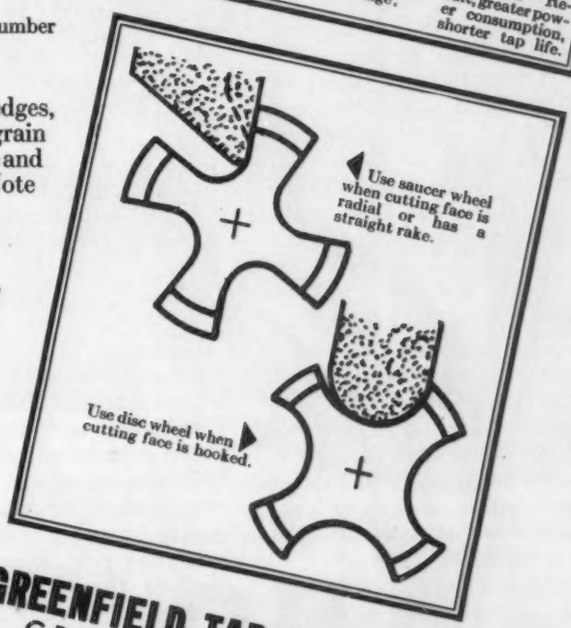
5. Completely grind away any broken teeth.

6. Polish the ground portion after sharpening if you are tapping soft or stringy materials that have a tendency to "load" the tap.

7. Taper Pipe Taps should always be machine ground and mechanically indexed to eliminate tapping out-of-round holes.

Remember that all taps become dull when in constant use. It takes more power to drive them and they often slow down the tapping machine resulting in lower production and excessive tap wear. *Keep your taps sharp.*


Correct: All lands in contact. Point diameter permits only one thread to enter.
Incorrect: Uneven chamfer on different lands. Result, poor threads, high tap breakage.
Incorrect: Point too small. Cutting burden concentrated. Result, greater power consumption, shorter tap life.



This is one of a series of advertisements published by Greenfield Tap & Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD • MASSACHUSETTS
DETROIT PLANT: 2102 West Fort St.
WAREHOUSES in New York, Chicago and Los Angeles
In Canada:
GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONT.

GTD GREENFIELD
TAPS • DIES • GAGES • TWIST DRILLS • REAMERS • SCREW PLATES • PIPE TOOLS

vital lesson here also in the fact that the auto industry (in common with most others) has never used more than one-half of its public relations voice, and has sometimes used even that half too sparingly. Management has used public relations to tell its story—some of it, at least—to the public. It has employed this specialized tool to try to interpret industry, and management, to the public. But it has left unused that half of the public relations voice which might have interpreted the public and its thoughts and opinions to management.

It is a matter of fact that some of the more astute public relations people in this industry did have foresight enough to analyze and predict to management months ago some of the things that have happened in recent weeks; but their managements apparently did not listen.

It is also something of a commentary on management's blindness on questions like this, that today the industry is cutting off virtually all of its advertising and publicity efforts—firing its "voice"—at a time when they are most needed as adjuncts to public relations, as avenues by which industry can transmit its message to the public, whether there are automobiles to sell, or not.

DEVELOPMENT of a mechanism, or organization, for the auto industry's transition into an all-out war industry should be worth watching. Insofar as this promises to occur here before it does in some of the other industries producing civilian goods, national attention will be focused on it. The first act is on now.

In the gap last week between the death of OPM and the beginning of real life in WPB, the industry held its first general meeting of the Automotive Council for War Production on Saturday. (See report of meeting elsewhere in this issue.) This group was organized shortly before the end of last year (See Jan. 8 issue, pp. 56-58) as a means of bringing together the many diverse automotive interests, including car manufacturers, truck makers, tool and die plants, and suppliers of parts and accessories. It has the weakness that it is a committee—it is hoped not another debating society—and it is not specifically constituted as a working organization, as was pointed out here last week. But it has some strong points and is already demonstrating that it can make some genuine contributions to the war effort. Most important of these is that some real working groups have been set up within the committee structure. These consist of a tooling information service, machine tool and equipment pooling service, a contract information service and a new, industry-conceived "shopping list." Prompt cooperation of all, especially the multitude of suppliers who are part of the industry, even though on its fringe, will be beneficial to all, and may develop into a real lifesaver for the little fellow who has not been able to get any war orders.

In addition, the ACWP has named sub-committees to deal specifically in problems related to military items like tanks, airframes, plane engines, small arms, etc. These will extend the industry's normal practice of exchanging information on patents, processes, etc.

OF course, one of the important functions of the ACWP will be to provide the industry, including all of the little plants, with an authoritative public relations voice. Obviously—to anyone associated with the industry—interchange of information, cooperation between technical groups, lending and selling of machine time and machines themselves, and good contacts between prime contractors and potential subcontractors, are all normal, unpublicized activities in this industry in peacetime. But if these activities can be speeded up, formalized through the ACWP, the scale of all these normal operations greatly increased, and the true story of the industry's war contributions told to the public, such things as the Reuther plan, and the Truman committee report, will have fewer harmful effects.

Biggest question ahead is what attitude Kanzler will take toward this set-up instituted by the industry. In his appearance before the group Saturday morning (understood to have been arranged at his request) he was non-committal. Certainly he didn't do any gladhanding; in fact there were overtones of admonition in his voice as he warned the industry that it must "develop a new point of view, a new sense of proportion" to achieve all-out production. At the same time, he gave no indication that he intends to be a whip-cracking czar over the industry. He kept his own counsel well, but sources close to him gave some hints that he will not "work through" or even "work with" any industry committee, pointing out that in his address to ACWP he had not even intimated that he would. Kanzler will listen to suggestions or advice from "anyone," they said, but again repeated that his appointment by Nelson was to do a job here "without debates." These sources also pointed out that the ACWP is "purely a private enterprise" and "has no official status."

As this is written early this week the industry is waiting for the first clues that will indicate what course Kanzler will follow and how he will organize his technical staff (yet to be recruited) for the job.

This week apparenty will mark the end of automobile production for a long time. Chairman Nelson has approved a WPB action, ordering cessation of all auto production, including military trucks, at midnight, January 31.

Last week the output of the industry continued to rise, to fill the January quota to the utmost. Assemblies totaled 79,930 units, compared with 75,625 in the previous week, and 121,948 a year ago, according to Ward's Reports, Inc. This final week's output is expected to taper sharply.

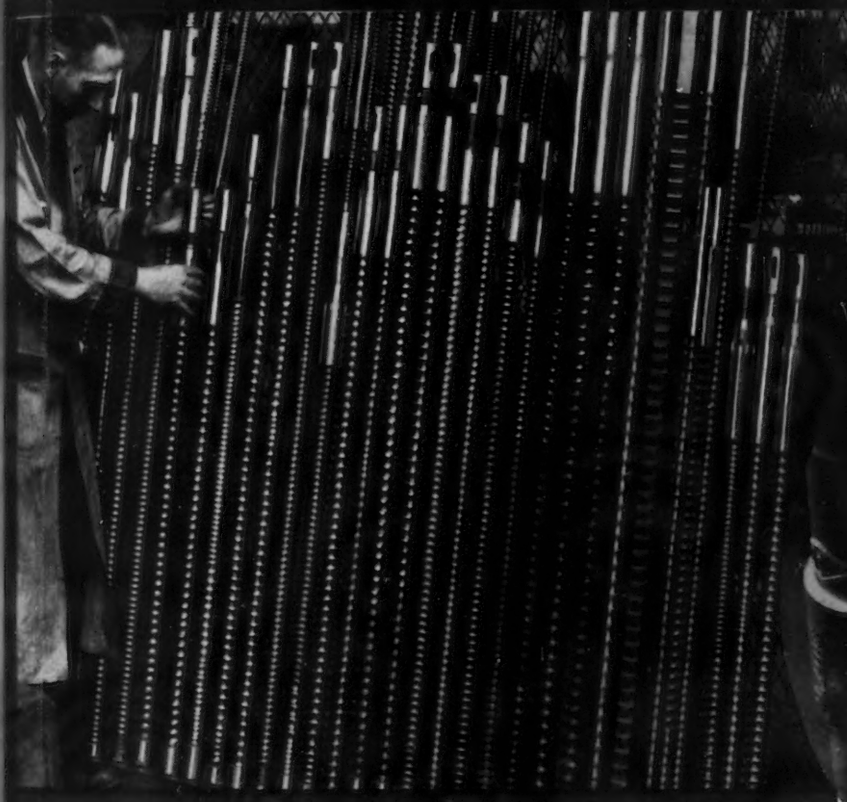
Machine Tool Employment Up Sharply at End of '41

Cleveland

• • • **The National Machine Tool** Builders' Association estimates that the workers employed in machine tool building plants at the end of 1941 exceeded 110,000 as compared with 78,100 estimated employed in December, 1940. This expansion in personnel is largely accredited to the training programs of individual machine tool manufacturers and thousands of people now working in such plants had been entirely unfamiliar with the work until undergoing training.

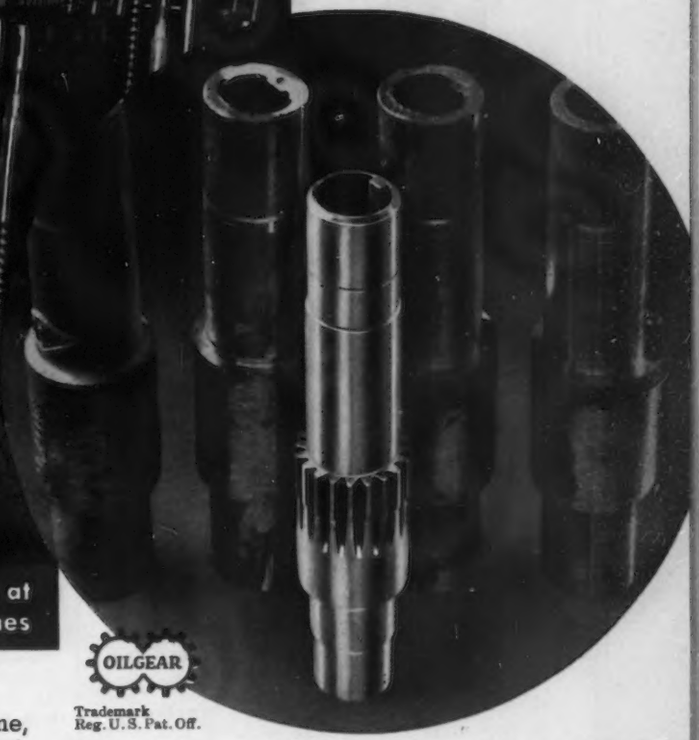
OILGEAR...

for the Nation's Leading Machine Tool Makers



Ammunition for Defense. All in a row . . . broaching tools at Kearney & Trecker for use on Two Oilgear Broaching Machines

The use of Oilgear Horizontal Broaching Machines enabled the Gisholt Machine Co. to improve the design of this cone gear sleeve with a solid key the full length of the sleeve. It prevents play and wear between shaft and sleeve. Former design was a keyway in gear sleeve, locked on spline shaft with a wing key.



OILGEAR

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• Barber-Colman, Cincinnati Bickford, Cincinnati Milling Machine, Delta, Ex-Cell-O, Giddings & Lewis, Gisholt, Greenlee, Illinois Tool, LeBlond, Monarch, Warner & Swasey . . . the growing list of leading machine tool makers who have recognized the vital importance of Oilgear Horizontal Broaching Machines to *their* part of the defense program, reads like a who's who of the machine tool industry.

• The production advantages of Oilgears are almost self-evident when you look at them from every angle. Their "bottleneck-breaking" speed, their amazing controllability, their ease of operation, their great tool and work capacity, and high precision all mean highest efficiency... more work per man-hour. And when you see the kind of jobs they'll handle—machining of keyways, splines, round and square holes, irregular holes, internal forms, and a host of other important operations—you'll see why Oilgear Horizontal Broaching Machines have won the recognition and praise of machine tool makers . . . of all auto, tractor, airplane and associate manufacturers . . . the country over. You'll see why Oilgears are such a vital part of production for defense.

• There is no time to lose. It's to your advantage to present your broaching problems to Oilgear specialists. You may need a horizontal broaching machine, or a vertical, but whatever your needs, Oilgear engineers have the answer. Act immediately. Use the coupon below for complete details of the Oilgear Horizontal Broaching Machines. THE OILGEAR COMPANY, 1324 W. Bruce Street, Milwaukee, Wis.

Feeds • Pumps • Cylinders • Valves • Motors • Transmissions
Horizontal and Vertical Broaching Machines • Horizontal and Vertical Presses
Custom Built Machines

OILGEAR

fluid power

BROACHING MACHINES

THE OILGEAR COMPANY, 1324 W. Bruce St., Milwaukee, Wis.
Please send descriptive bulletin 20000A without obligation.

Name _____

Company _____

Street _____

City _____ *State* _____

Washington . . .

• Collection of 3 million tons of auto scrap calculated . . . If necessary, old cars held by dealers for higher prices will be requisitioned and directed to consuming areas where the need is greatest.

WASHINGTON—One of the last things OPM did before it was absorbed by the new War Production Board was to work out a plan to scour the country for iron and steel scrap. The OPM disappeared in name only and was fitted into the powerful board headed by Donald M. Nelson for the purpose of closer coordination of defense operations. One of the things that will be done immediately by the board will be to push the campaign to gather scrap from the highways and byways.

The board is disturbed over the shortage of scrap which has occasioned the opinion frequently heard in the steel trade that lack of old material presages a smaller output of steel in 1942 than that of 1941. In the Iron and Steel Branch of WPB this view is not shared—at least not by some of those in the branch and in other government agencies. On the contrary they have been insisting that the time is past for talking about a campaign to recover scrap and that it is time to do a real job. Past efforts are held to have been of a hit-and-miss character with the result that they have yielded but little scrap after a lot of talk.

WITH this end in view, a rather drastic step has been taken which it is hoped will mean the salvaging of 4,000,000 to 5,000,000 junked automobiles. It is also planned to expedite the shipment of railroad scrap and to go in for taking up abandoned railroad and street car lines, an expensive undertaking but one that is held to be necessary if steel and foundry production in 1942 is to be maintained. Then also from the farms agricultural scrap will be accumulated pending completion of new blast furnace capacity.

It is estimated that in order to achieve this goal, collection of scrap from peddlers and auto wreckers must be increased one-third over the 1941 collection. To fortify the plan to gather auto scrap, the Inventory Control and Requisitioning Section of what is now the War Production Board has taken over. Its name indicates its authority. It is calculating on the collection of 3,000,000 tons of auto scrap with the use of the necessary forms and procedures that have been approved. If necessary, it was stated, old cars held by dealers for higher prices will be requisitioned. OPA has made it clear that it does not propose to lift prevailing ceiling prices.

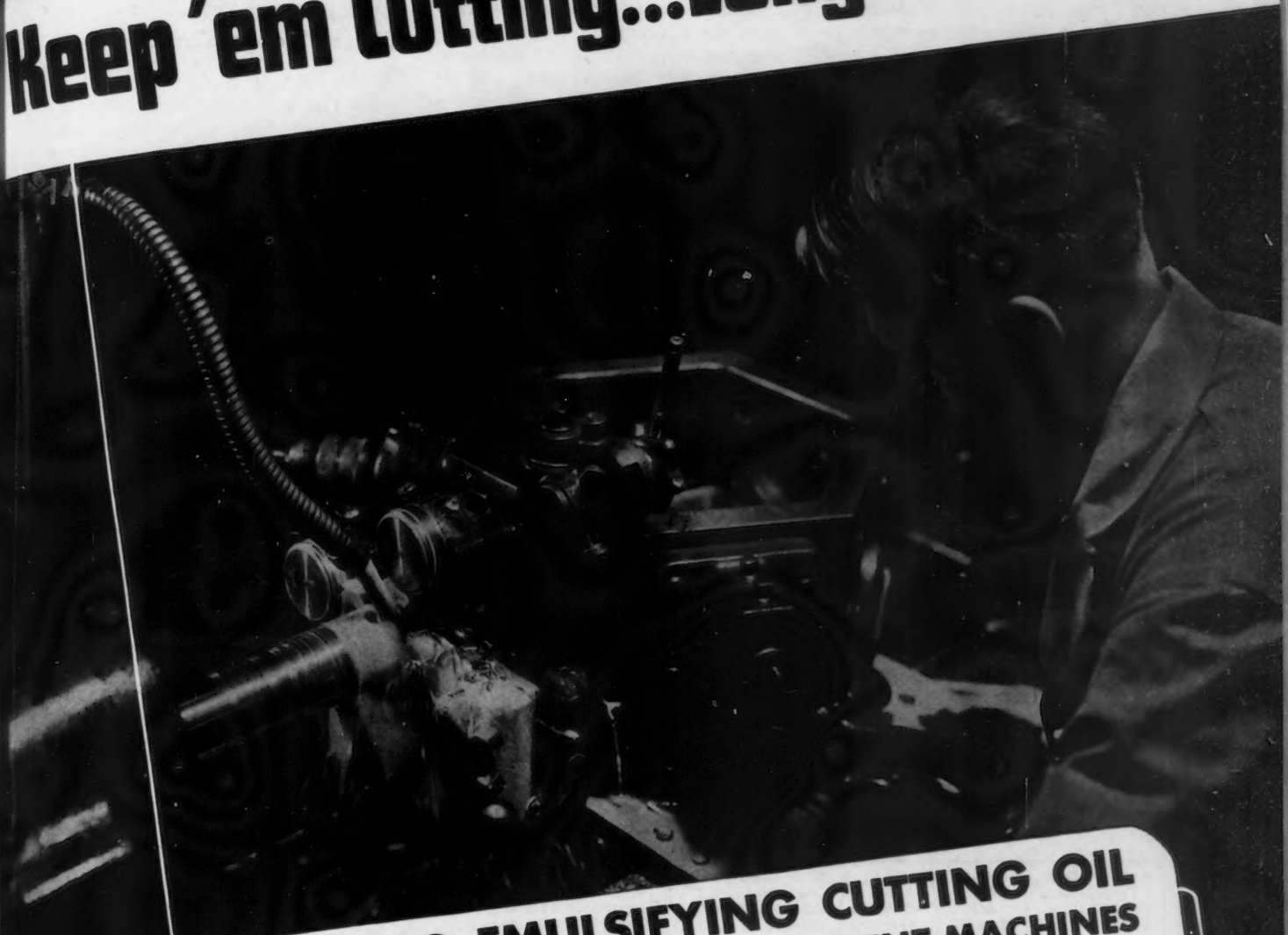
Baling facilities for bodies, thought at one time to be a chokepoint, are now considered adequate except in remote areas such as the Rocky Mountain region. Automobiles are considered good scrap since frames, wheels and rims are low in phosphorus and sulphur content, and motor parts are high grade steels acceptable for open hearth use. A large percentage of motor blocks made from gray iron castings will be shipped to gray iron foundries.

ONCE the material is requisitioned it will be directed to the particular company which is in the greatest need, and the govern-

THIS IS THE WPB: War Production Chief, Donald M. Nelson, calls the first meeting of the WPB to help speed war material production. Sitting, left to right, the board members are: Leon Henderson, Price Administrator; James Forrestal, Under-Secretary of the Navy; Jesse Jones, Federal Loan Administrator; Frank Knox, Secretary of the Navy; Donald M. Nelson; Henry A. Wallace, Chairman of the Board of Economic Warfare; Robert P. Patterson, Under-Secretary of War; Lt. Gen. W. S. Knudsen, U. S. Army and Director General of Production Management. Standing, left to right, are: Herbert Emmerich, Executive Secretary of the War Production Board, and John Lord O'Brien, War Production Board Counsel.

British-Combine Photo

Keep 'em Cutting...Longer...Faster



SUNOCO EMULSIFYING CUTTING OIL PERMITS HIGHER P-Q* FOR PRESENT MACHINES

This is no time to worry over priorities on machine tools. Your urgent job is to set and maintain a higher P-Q* (Production Quota) with present equipment . . . and SUNOCO EMULSIFYING CUTTING OIL will help you do it!

SUNOCO has long been the choice of the leaders in the metal working industry. They know SUNOCO's high lubricating and heat absorbing qualities permit more pieces per tool grind . . . enable machine tools to operate at rated capacity plus . . . make possible finer finishes, closer tolerances, fewer rejects.

Let SUNOCO help you set a higher Production Quota. Call in a SUN "Doctor of Industry" — a metal working expert. Let him prove the merits of SUNOCO for stepping up production in your own shop . . . under your own operating conditions. Write today to SUN OIL COMPANY, Philadelphia, Pa.

*Production Quota

LET'S GO! U.S.A. KEEP 'EM FLYING!

PERFORMANCE DATA

OPERATION — Turning 3½" bar

MACHINE — Warner & Swasey 2-A Universal Heavy Duty Turret Lathe

CUTTING LUBRICANT — 1 part Sunoco to 20 parts water

SUNOCO

SUN PETROLEUM PRODUCTS HELPING INDUSTRY HELP AMERICA

ment will absorb excess transportation costs. No court process will be necessary. United States Marshals and the Army and Navy will serve the seizure orders, if necessary, on the particular scrap dealers whose junked cars are to be requisitioned. Parts and accessories, which now have a high value, by reason of shutting down on passenger car production, will not be taken by the Government but will be left in the possession of owners.

Government analysts in a study predict that unless scrap collection is increased by one-third over last year, steel production will fall 4,000,000 to 6,000,000 tons under capacity, which they place at 89,000,000 tons by the end of the present year. This would mean an output of 83,000,000 to 85,000,000 tons, compared with about 83,000,000 tons in 1941. Many believe that though it is on the gloomy side, the study is too optimistic and that unless sufficient scrap is recovered to offset the inadequate pig iron capacity, the 1942 steel production will fall off more than the forecast indicates.

The industry generally agrees with the government estimate that war needs together with lend-lease requirements alone may absorb more steel than has been produced in any previous year. Thus the civilian would be left holding the bag. Even greater requirements will be taken under the 1943 Victory program as outlined by the President.

The Department of Agriculture estimates that 1,600,000 tons of scrap can be obtained from the farms of the country and it is of the opinion that an intensive search would uncover new sources in other fields that have not as yet been tapped. In this connection there prevails an opinion that, if approached properly, a house-to-house national campaign would be much more effective than have been the localized efforts of the past. But for one thing householders should be made to understand, as the Department of Agriculture study points out, that they are not entitled to prices quoted in trade journals, since the quoted levels cover delivered prices.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

APPROVE THIS, WILL YOU, WITH YOUR O.K.?
CAN YOU GO OVER THIS? WE'RE HOLDIN' IT UP!
WILL YOU CHECK THESE STEEL TESTS ?
I SHOULDN'T LAUGH, BUT I REMEMBER WHEN THE OLD BULL WAS A MAGNIFICENT FIGURE AROUND HERE--POISED, DIGNIFIED!
THAT'S WHEN HE HAD TIME TO THINK! THERE'S NO TIME TO THINK NOW--HE'S LIKE AN EGG THAT WAS LAID IN TH' LAST WAR AND OPENED IN THIS ONE!
BREAKING THE OLD SHELL
J.R.WILLIAMS 1-30
T. M. REG. U. S. PAT. OFF. COPR. 1942 BY NEA SERVICE, INC.

Cold Finished Producers Discuss Standardization

Washington

• • • **The standardization** of cold rolled steel sizes was discussed last week by cold finished steel producers and government representatives under the auspices of the Iron and Steel Branch, Materials Division, OPM (now WPB). William G. Hume of the Cold Finished Steel Branch, was government presiding officer.

Problems discussed at the meeting included the interests of the armed forces in having many sizes of steel for shells, the determination of what sizes and grades of steel are regularly distributed and the sizes of cold steel units distributed at present, so that manufacturers and government representatives can eliminate unnecessary sizes.

A committee from the American Steel Warehouse Association attended the meeting. Others included representatives of the Army, Navy, and the subcommittee of cold finished bars, Iron and Steel Branch, Materials Division, and Bureau of Industry Advisory Committees.

New Orleans Yard Gets Award for 28 More Ships

Washington

• • • **The Maritime Commission** has approved contracts for the construction of 28 more Liberty ships by the Delta Shipbuilding Co., Inc., New Orleans. Steel requirements will be about 103,000 tons. On Jan 17 the Commission announced completion of negotiations for 632 additional vessels. The New Orleans yard, which is now engaged in the construction of 33 Liberty ships, will complete all 61 vessels under contract to it by the end of 1943.

Award of this contract increases the total of Liberty ships under construction to 997.

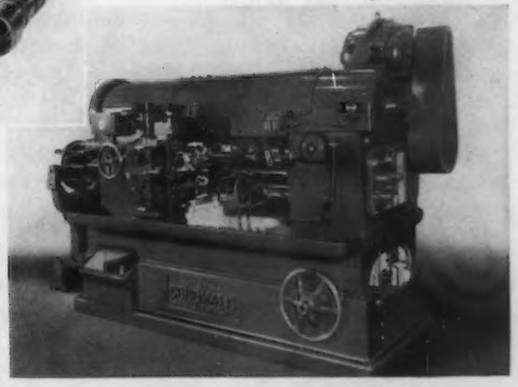
Contract for Hoists Placed With Oregon Corporation

• • • **The Willamette** Iron & Steel Corp., Portland., Ore., has been awarded a $335,182 contract for six hydraulic hoists which will operate penstock coaster gates at the Grand Coulee Dam.

Up Steps Armament
WITH CONOMATICS

Hose connections produced on a 6 spindle Conomatic.

Front view of a 6 spindle Conomatic.

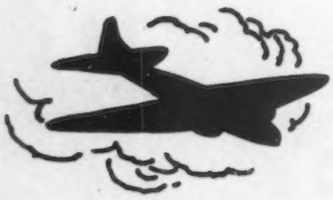


Write **NOW** for particulars and catalog.

CONE AUTOMATIC MACHINE CO., INC., WINDSOR, VERMONT, U. S. A.

WEST COAST . . .

• Reduction in variety of materials needed for aircraft manufacture is found easy . . . Domestic producers of strategic minerals, aided by higher unit prices, now need assistance in getting access roads built.



SAN FRANCISCO — Drastic weeding out of the variety of aluminum, aluminum alloys, and alloy steels, particularly stainless, required for aircraft manufacture is relatively easy, the National Aircraft Standards Committee has found after surveying the general alloys and stock sizes now being ordered in sheets, bars and tubes.

A blackboard tabulation of these items from material control records of aircraft companies brought to conference by the standards engineers shows that very little sacrifice is necessary to cut nearly one-half the variety of sizes from present mill demands.

Thirty sheet thicknesses are reduced to 16 by dropping many catalog "gages" with overlapping tolerances. No attempt has been made to set up a theoretical system of sheet thicknesses; instead, a "natural" size has been taken from the bulk of the orders by the majority of companies. (The N.A.S.C. joins with the American Standards Association in shunning "gages," using instead inch measurements to three decimals).

The essence of the task is to standardize where the trouble starts by bringing these sizes to the attention of the layout designer. He is instructed that these sizes are standard among all major companies. He may, for good reason, choose a non-standard size or thickness, but he will wait for it and pay for it.

BY mutual agreement between the Society of Automotive Engineers and the Standards Committee, the S.A.E. will choose the specifications of automotive and aircraft metals used by the industry; the N.A.S.C. will continue to handle the selection of general alloys, tempers and sizes. Committees are at work in two groups. The alloy steels group is headed by Eric Dudley, standards and materials engineer for Curtiss-Wright at Buffalo; aluminum alloys work is directed by Carel Torresen, standards and materials engineer for North American Aviation at Inglewood.

Significance of the standards engineers of principal manufacturers constantly working together under the banner of the N.A.S.C. is tremendous at this time when general setting up of standards and their acceptance is so important in the aircraft industry. The part played by this group in speeding aircraft production will not easily be calculated, but it will be substantial. Larger standardization jobs can well be assigned to it, and a concerted effort should be made to put the standards into force as they are established.

Recent raising of unit prices by the Metals Reserve Co. by no means takes away all the barriers to broader and more intensive working of domestic strategic mineral deposits. One of the deterrents that remains is the difficulty of getting access roads built.

Most of the deposits of strategic minerals are recognized to be small and scattered all over the map of the Western states. This is particularly true of chromite and to a lesser degree of manganese, tungsten, quicksilver and antimony. On top of these drawbacks, nine-tenths of the deposits contain only low grade ore.

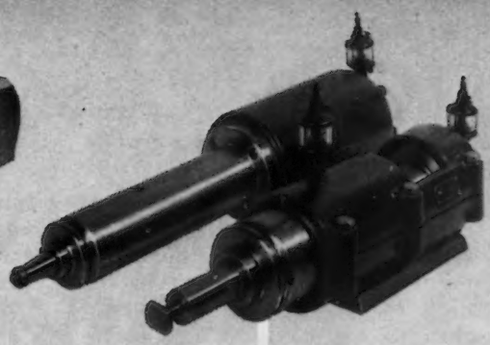
FOR some geological reason, minerals of this character always seem to occur in the most inaccessible mountains or most arid deserts far from trunk highways or even secondary roads. Many times, both these drawbacks of site are combined, and the deposits lie in desert mountains.

As the law now stands, access roads to sources of raw material, such as strategic minerals, fall in the same category with access roads to military and naval bases and defense plants. Before government money can be used to build access roads of this character, certification of necessity must be made by either the Secretary of War or Secretary of Navy. No provision is made for application to someone in the field, nor is any clear-cut course laid down for getting the ear of these busy gentlemen 3000 miles away.

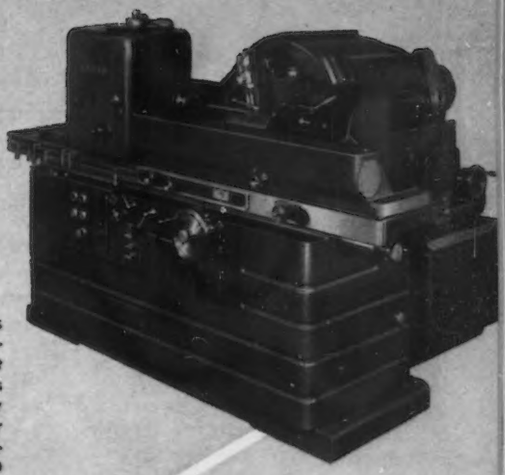
What chance has some little rabbit hole miner in Nevada, a desert rat who knows every vein and lease but no government official to get certification from the Secretary of War or Navy whose prime interests are military production and operation? "Next to none," is the answer, of course. But that isn't all the difficulty. The character of most of these deposits is such that even if investigation were made by proper authorities, chances are that it would show that value of mineral deposits to be tapped would be insufficient to justify a road under normal conditions. In some cases the road might even cost more than the value of the minerals to be taken out over it.

The point is that although the deposits are small and scattered, the minerals to be obtained are essential for making high grade steel. You can't make alloys out of roads, and even if road building cost is way out of line, the roads should be built whatever the cost if the minerals can be obtained in no other way. The ridiculous necessity of requiring the Secretary of War or Navy to certify such projects should be eliminated, and final judgment on the matter given to some one in the territory more intimately concerned with mineral production problems, such as a WPB minerals unit representative.

MONEY should be appropriated for building these roads, for the present outlook is that military and naval projects will require more

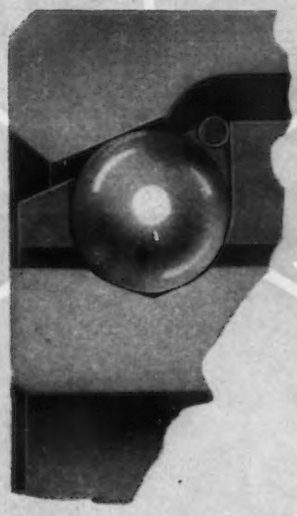


ABOVE: Ex-Cell-O motor-driven and belt-driven types of spindles. *BELOW:* Close-up view of Ex-Cell-O *Precision* Ball Bearing. Through the arrangement of point contact between the ball and the race, each ball is given a gentle spinning motion that results in every part of the surface of each ball being presented for wear. This minimizes bearing wear and aids in maintaining the spherical shape of each ball. Ex-Cell-O Precision Bearings on Ex-Cell-O Spindles are interchangeable as a unit.



Precision Boring as universally used today was developed mainly through the availability of the Ex-Cell-O *Precision* spindle. Above is Style 1212-A, one of nine standard Ex-Cell-O Precision Boring Machines featuring the Ex-Cell-O *Precision* Spindle.

Thread Grinding Machines, producing work to extremely close limits, must have *Precision* Spindles. Above is Style 35 Universal, one of eight styles of Precision Thread Grinders made by Ex-Cell-O, all equipped with Ex-Cell-O *Precision* Spindles.



TO LEFT: Ex-Cell-O Style 44 Carbide Tool Grinder, equipped with Ex-Cell-O inbuilt balanced motor spindle mounted in Ex-Cell-O *Precision* Ball Bearings.

TO RIGHT: Ex-Cell-O Center Lapping Machine, Style 74, for accurately conditioning female centers. This Ex-Cell-O machine also features the Ex-Cell-O *Precision* Ball Bearing Spindle.

PRECISION *begins with the* EX-CELL-O BEARING

The greater accuracy, increased production, and better finish that a large number of manufacturers are obtaining today on Ex-Cell-O machine tools equipped with the Ex-Cell-O Precision Spindle can, to a great extent, be attributed directly to the superior features of the Ex-Cell-O spindle ball bearing—a bearing specially designed by Ex-Cell-O and precision fitted by patented Ex-Cell-O methods. For instance, many thousands of Ex-Cell-O grinding spindles with these special bearings are in daily operation throughout American industry—satisfactorily meeting all the demands made upon them by today's strenuous production pace. This is why many manufacturers of grinders use the Ex-Cell-O Precision Spindle as part of their original equipment, and why numerous metal-working plants throughout the United States insist upon the Ex-Cell-O Precision Spindle whenever spindle replacements have to be made.

EX-CELL-O CORPORATION • DETROIT, MICH.

THREAD GRINDING, BORING AND LAPPING MACHINES • TOOL GRINDERS • HYDRAULIC POWER UNITS • GRINDING SPINDLES • BROACHES • CUTTING TOOLS • DRILL JIG BUSHINGS • DIESEL FUEL INJECTION EQUIPMENT • R. R. PINS AND BUSHINGS • PRECISION PARTS

XLO

EX-CELL-O *means* PRECISION

than the funds at present authorized for access roads.

Despite the difficulties, access roads to two or three of the more publicized deposits have been properly certified, and two or three more are said to be up for certification. In each of these cases, approval has been the result of months of effort by a man whose time could be better spent promoting mineral production.

Even though development of mineral deposits may warrant building of an access road by its owners, and even though they may have the money to build the road, priorities on critical materials can only be obtained for roads certified to be of a defense character. Mountain roads generally need reinforced bridges, or at least culverts. requiring critical materials unobtainable without priorities. So the matter now stands that, although the need for stimulating domestic production has become imperative since the declaration of war, such economic and practical difficulties as almost confiscatory excess profits taxes and the difficulty of making deposits accessible still provide a constant brake to their development.

The wise guy who, when the scrap iron and steel shortage is mentioned, says, "Why not dig up old street car tracks?" may yet get serious attention at Seattle. Seattle is unique in that within the past two years it has completely changed over its urban transportation system from street cars to busses. The tracks that remain in the pavement are not just a few hundred tons from spur lines but are estimated to be about 16,000 tons. The city fathers, not averse to smoothing their streets in the name of the war effort, have offered the rails to the government gratis if Uncle Sam will dig them out and replace the pavement. Portland has made the same offer for 3700 tons of rails buried in its streets. The cost estimate for digging and repaving runs only between $20 to $25 per ton, well above the Coast ceiling price, but still distinctly an economic possibility if the scrap shortage becomes severe. Seattle mills are not crying for scrap as loudly as those in some other parts of the country, and one mill goes so far as to say that it is "not yet bothered by scrap shortage."

Farther down the Coast, in California, mills just now are enjoying a ripple of scrap flowing from remote areas, and for the most part are well fixed for the immediate future. Scrap yards which a few weeks ago were barren, now even show a reserve pile rising above their fences.

THIS healing of the shortage is only temporary, and it is generally believed that when the basic shortage caused in the past decade by Japanese removal of scrap resources reappears, the situation will be worse than ever. Incidentally, talk by some scrap brokers that the government should not be severely censured for letting the scrap go to the Japanese, on the grounds that these exports were not great compared to our present shortage, should be publicly corrected. The Japs took their scrap where it hurt the most, not only iron and steel, but copper and nickel. Furthermore, the government let scrap leave the Pacific Coast under export-license, despite the so-called embargo, as recently as 12 months ago. Apparently the industry was not consulted, for the present scrap supply situation was partially foreseeable at that time, and in almost treasonable appeasement this instance ranks well near the top of the list.

Representative foundries report that very little pig iron is now moving in except on allocation. No foundry pig is now available from producers west of the Mississippi, and local foundries are in a poor position to compete with those close to eastern sources of supply.

Eastern mills are supplying a far greater proportion of reinforcing steel used in Coast non-military projects than ever before. Eastern suppliers never before seen on award lists here are appearing in far greater numbers, giving prevalence to the belief here that eastern bar mill capacity is nowhere near as overloaded as that of Coast mills.

FACTORY DIGS IN: To protect the Douglas Aircraft Co.'s assembly line against air attack, defense volunteers during their off-duty time returned to the Santa Monica, El Segundo, and Long Beach, Calif., plants to set up sand bag barricades around equipment and at strategic places in buildings.

ASM to Give Products Advice

• • • A War Products Advisory Committee, consisting of 32 members under the chairmanship of G. W. Strahan, has been formed by the New York Chapter of the American Society for Metals. Its purpose is to assist manufacturers upon inquiries mailed to the committee, 67 Wall Street, or telephoned to Mr. Strahan at Whitehall 4-1000.

YOU'LL FIND IT WILL PAY TO TRUSCONVEY YOUR PLANT MATERIALS

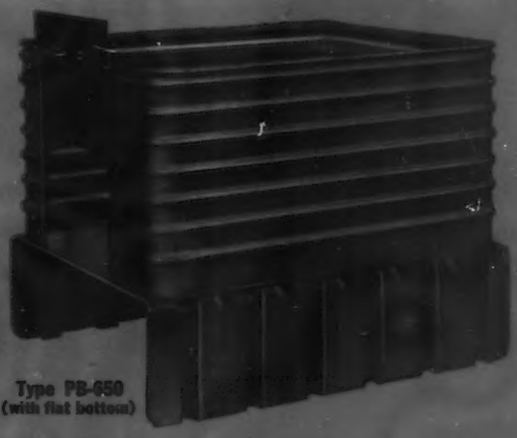
TRUSCONVEY means the quick, Johnny-on-the-spot movement and delivery of parts and materials—from neat, orderly, easy-to-get-at points throughout your plant—with the aid of strong, efficiently-designed Truscon Steel Boxes and Skid Platforms.

• Now, to meet wartime needs, your plant must be geared up to production schedules never before required. That means *faster* action, *less* waste motion, *more efficient* work in each and every one of your manufacturing steps. • You can help meet these new requirements of your plant by permitting us to study your handling operations and requirements. We then can make well-planned recommendations exactly suited to your needs, embodying Truscon Steel Boxes and Steel Skids designed to fit your individual needs. • Throughout America, Truscon Materials Handling Equipment is simplifying operations and speeding production. Its ability to stand up year after year despite hard service and adverse conditions, has proved that in the long run it is the cheapest and most profitable equipment. • Learn to say TRUS*CONVEY*—learn the many benefits you will receive from Truscon Steel Boxes and Steel Skids—write us for illustrated literature today, and ask for a plant survey without obligation.

Type B-80 C
(with corrugated bottom)

Investigate TRUSCON Foundry Flasks

Light weight . . . durability . . . strength where strength is needed . . . easily rammed and shaken out . . . these are features of economy and production you get in TRUSCON foundry flasks. *Write for descriptive literature on complete line.*



Type PB-650
(with flat bottom)

Type PB-150
(without flat bottom)

Truscon

MATERIALS HANDLING EQUIPMENT

Truscon Steel Co., Pressed Steel Division, 6100 Truscon Avenue, Cleveland, Ohio. Subsidiary of Republic Steel Corporation.

YOU'LL FIND IT WILL PAY TO *TRUSCONVEY* YOUR PLANT MATERIALS

Fatigue Cracks BY A. H. DIX . . .

Application for an "A"

• • • If St. Peter has a separate scoreboard reserved for trade papers we hope he remembered to give us a big A in bold-face Italic for devising the Priorities Guide.

The Guide is the aspirin that is curing countless priorities headaches. Like a nervous stomach, it is standard equipment among those who deal with priorities, either in industry or in the Government. So soundly did the brains department build in working up the first Guide last September that the pattern has been as widely copied as No. 1 on the Hit Parade.

The fourth edition of the Guide, brought up to date and with many new features, is presented to you as a separate section of this issue—16 pages on green paper. If you don't find it here someone has beaten you to it. We have distributed 119,000 copies of the Guide to an avid industry, and the encomiums it has been paid would fill an encyclopedia from A to Oca.

If you want additional copies, write us at 100 E. 42nd St., New York. Prices are:

1 to 10 copies	25¢ each
11 to 100 copies	20¢ each
101 to 300 copies	18¢ each
300 or more copies	15¢ each

Stamps or coin with orders for less than a dollar would be appreciated.

Lubricated Pun

• • • Among the great number of firms inside as well as outside your favorite family journal's field that has written for copies of the Guide is the Battenfeld Grease & Oil Corp., Kansas City grease manufacturer.

We single it out for mention only because its letterhead bears a slogan that sets a new record of some kind —*"Business is Ingreasing."*

New High

• • • The news of the 59 billion dollar budget may have driven it from your mind, but last week was National Thrift Week, which somehow makes us think of a person with weak lungs and a mouthful of crackers whistling in a hurricane.

Aptronyms

• • • The purchasing agent of the Penn-Jersey Shipbuilding Co., Camden, N. J., is G. P. Seabrease. And Hugh Sharp, your Milwaukee reporter, informs us that South Milwaukee is now Ohmless, as the city electrician, Robert Ohm, has just resigned.

Both of these are exactly pat, perhaps too pat. We like those that are a little off center, like the fact that the Champion Rivet Company's Houston, Tex., representative is Thomas J. Kegg.

Blurb

• • • Radio performers are paid roughly according to their Crossley rating. This rating is established by telephoning to a cross section of radio listeners and finding out on what programs they are tuned in. Anything over 30 is stratospheric. At the moment Benny and Hope are fighting for top position, with a Crossley of 33, meaning that about one out of every three set owners tunes in.

In the trade paper field the Crossley rating is the proportion of subscribers that say *"Send your publication for another year."* This is known as the "subscription renewal percentage." A trade paper editor would rather have a high one than a sure cure for baldness. We have just figured ours out for the current period. It is up again—81.68 per cent.

Above that you have to use oxygen.

Hoosegow for Malaprops

> . . . I call for a patriotic uprising against all who impede the march to victory by calling howitzers "howsiters" and refer to the cavalry as "calvary."
>
> —*Deac*

The other day we heard someone speak of "sinister carbides."

How to Win the War

• • • These days almost everyone has a little voice that keeps asking, "What can I do to help win the war?" In most cases the answer to the yearning to serve is in the title of the old song, *"Keep on Doin' What You're Doin'*," for you can't win a war with everyone gnawing his nails because he isn't steering a tank, guiding a bomber, or aiming an anti-aircraft gun.

The cutting tool, the part of a lathe that actually peels off the metal, weighs only a couple of ounces, but to do its job it has to be backed up by a ton of machinery. It's the backing-up job that makes the fighting front strong.

Which reminds us to pat the collective back of the Reading, Pa., advertising agency, Beaumont, Heller & Sperling, for this excellent definition of the duty of advertising during the emergency:

> Now advertising has a duty to the Nation. That duty is to inform men and women how to do the things that will expedite war production . . . how to cooperate personally, in their homes and in their businesses, to win the war . . . how to conserve, and avoid waste . . . how to live and keep healthy!
>
> All advertising should perform its share of this duty to the fullest.

War Is Hell Dept.

• • • A member of our field staff reports:

> Yesterday I called on the ..... plant and the boss complained about certain priority ratings given on items for the government, such as an A-1A on a reflector for a desk lamp. It is special and has to be made to order. "Why in h—," the boss said, "don't they use something out of stock, instead of interrupting production because a fancy pants wants something special?"

This is a time to make sacrifices, even to the extent of using a standard desk lamp.

She Works on Wheels

• • • Bill Sherman red-pencils this paragraph in a recent "My Day":

"We accomplished a great deal of work on our train trip Thursday. Far more than I thought would be possible, so I am planning to take another one before long to finish various odd jobs."

He marks it, "Add: Reasons for traveling." To us it seems an excellent reason. There are those who, while seated at a desk, find their thoughts as hard to marshal as the first grade class at a state fair, but whose minds begin to function in the orderly manner of a radial engine as soon as they begin to look out of a train window.

We think that Mrs. Roosevelt has something and that she ought to talk the Pullman Company into renting offices on wheels to those who think best while in motion.

Problem

Last week's transfer of wine and water was equal. Five minutes should do for this:

So over-run was a monastery with mice that the abbot gave orders for all the cats in the county to be put to work. At the end of the year it was found that every cat had killed an equal number of mice and that the total mice killed was exactly 1,111,111. The mice exceeded the cats. How many cats were there?

ALLOYS

Timely information about metals...
CATALOGUED for your convenience

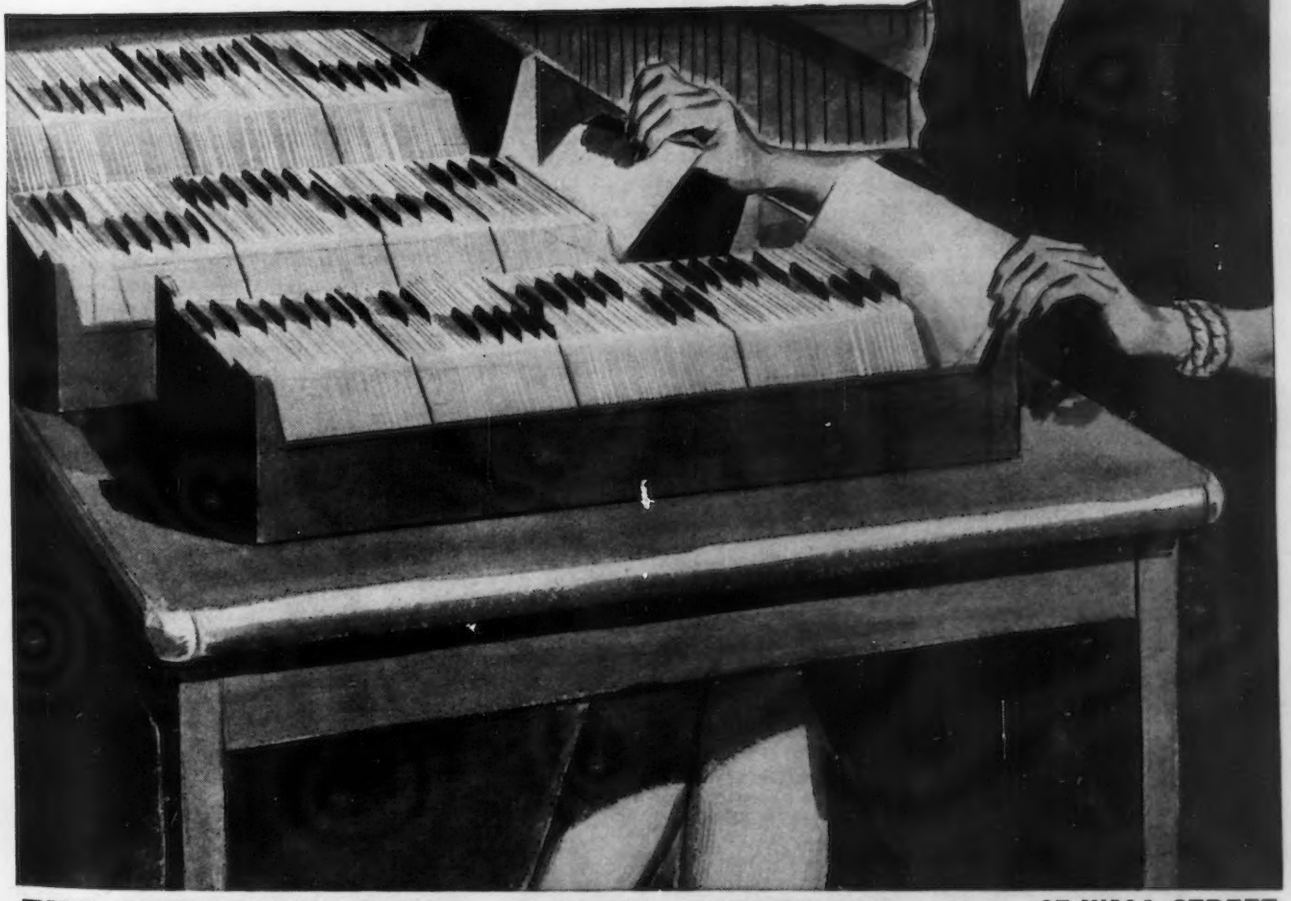
Specific answers to many of your questions about the selection, fabrication and uses of Nickel alloys are available to you quickly from our files.

This fund of helpful information we have gathered, checked and condensed into convenient printed form. The graphs, charts and shop guides are especially useful to men handling new materials or performing unfamiliar operations . . . and to new employees. This literature is available on request.

You are also offered the assistance of our technical staff in solving material problems arising from a temporary lack of Nickel. These engineers are offering timely suggestions to many vital industries during the present emergency.

Why not drop us a card asking for list of available literature. Your request for the assistance will receive prompt attention.

NICKEL



THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET
NEW YORK, N. Y.

Dear Editor:

INDUCTION HARDENING

Sir:

We were interested in THE IRON AGE's Nov. 6, 1941, summary of A. D. Assonov's article on Russian experiments with induction surface hardening of crankshafts . . . somewhat surprised to note V. P. Vologdin and V. N. Romanov take credit for having invented and developed the art of surface hardening by high frequency inductive heating, at least as applied to crankshafts.

. . . Our company's first activities in the field of hardened crankshafts date back more than 10 years. About January, 1936, we received a visit from two Russian engineers from one of the Russian automobile plants who came to investigate our Tocco process of induction hardening for cams and crankshafts. These men returned to us for further conference and information and subsequently thereafter a very considerable number of different Russian engineers visited us seeking technical information.

Some months later we sold the Russian Government . . . a large installation of Tocco equipment for hardening crankshafts and camshafts, and at the same time we contracted to train a considerable number of Russian engineers in the art of high frequency heating and hardening. . . . The training was complete and thorough and even included designing of the Tocco process equipment itself.

The idea of a single induction machine arranged with a sufficient number of heating units (13 in Vologdin's Russian machine) to harden all the bearing areas of a crankshaft at one setting is not new to us. . . . The 2½ min. hardening cycle achieved by the 13-inductor unit of Vologdin results in a lower production rate than in our present standard 4-stage unit. We guaranteed the Russian commission 30 crankshafts an hour in the spring of 1936 and received orders on that guarantee.

. . . It is interesting to note that a number of very complete articles on high frequency inductive heating that have been published in Russian journals were prepared by Russian engineers at our plant. . . . The Russians have been good customers of Ohio Crankshaft. However, . . . we thought your readers might be interested in this background.

. . . If the Russians feel they were first, we're not going to worry . . . unless they fail to use the induction process to harden parts going into their military equipment!!

F. S. DENNEEN
Ohio Crankshaft Co.
Cleveland

POLICY ON BRIQUETTES

Sir:

. . . We were interested in your comments (Scrap—OPA's Problem Child, Jan. 1,) relative to briquetting borings and turnings. We are currently installing a briquetting press (investment to date is $50,000) for which we were given an A-1-a priority rating.

. . . We have gone ahead with this program on the theory that we would be converting material, which has heretofore been considered practically waste, into usable, high grade scrap. . . . However during the past couple of months we have found that a large portion of these tonnages (available from local plants) has been, . . . flowing to steel mills. One example is the direct allocation by OPM . . . of the very large tonnage produced at Mare Island Navy Yard to Bethlehem Steel's open hearths.

We are doing considerable work in an effort to have recognized and established a policy whereby cast scrap, particularly borings, will go to iron foundries, via briquetting plants, and steel scrap to steel mills.

The writer recently made a second trip to Washington to discuss the matter, with OPM, but with only a small degree of success.

H. McCAUGHEY
Vulcan Foundry Co.
Oakland, Calif.

DURAMET OR DURIMET

Sir:

I . . . was looking through THE IRON AGE for a metal called duramet or something like that. I would like to know what it can be used for and its properties.

PVT. MURRAY COHEN
68th Materiel Squadron
Lawson Field,
Benning, Ga.

● Pvt. Cohen probably has Durimet in mind. This is a Cr-Ni iron alloy made by Duriron Co., Dayton, Ohio, for high temperature service in corrosive atmospheres.—Ed.

CCC AS FIRE WARDENS

Sir:

Have read many of your editorials and have enjoyed them immensely. However, I want to take exception to your statement in the Jan. 15 issue "it has been nice, for example, to have our CCC boys take such good care of cleaning brush, etc."

I . . . witnessed many raging forest fires. These are always caused by fires starting in the brush and each time millions of dollars of fine timber go up in smoke, and many water sheds are ruined.

Now supposing this summer, when the dry season comes, a few enemy planes would fly over those forests and drop an incendiary bomb every 20 miles. We would have a terrible catastrophe.

What we should do is get a great army of our boys from 16 to 18 to start clearing the underbrush and act as fire wardens in those forests.

A. I. BIERFREUND
Eisenstadt Mfg. Co.
St. Louis.

LET US RESOLVE

Sir:

Congratulations on your magnificent Jan. 1 edition. This issue is certainly a masterpiece and one that should remain on file for a long time to come. . . . I am especially impressed by the editorial "Let Us Resolve" and also by the open letter from Mr. William S. Knudsen.

. . . I would appreciate 50 reprints of the editorial and the Knudsen letter. It is my intention to place one of each in the pay envelopes of our employees so that they in turn can have these letters as an inspiration to do a better job.

WILLIAM W. BURNS, SR.
Burns Bottling Machine Works, Inc.
Baltimore

AIRCRAFT METALLURGY

Sir:

. . . Read with interest the article entitled "Metallurgy of Aircraft Engines," appearing in the Dec. 25th issue. Since much of the information contained in the report is pertinent to what this division is doing, would you be so kind as to send a reprint of the article.

S. J. BRODERICK
Materials Laboratory
War Department Air Corps
Wright Field, Dayton, O.

WELCOME BACK

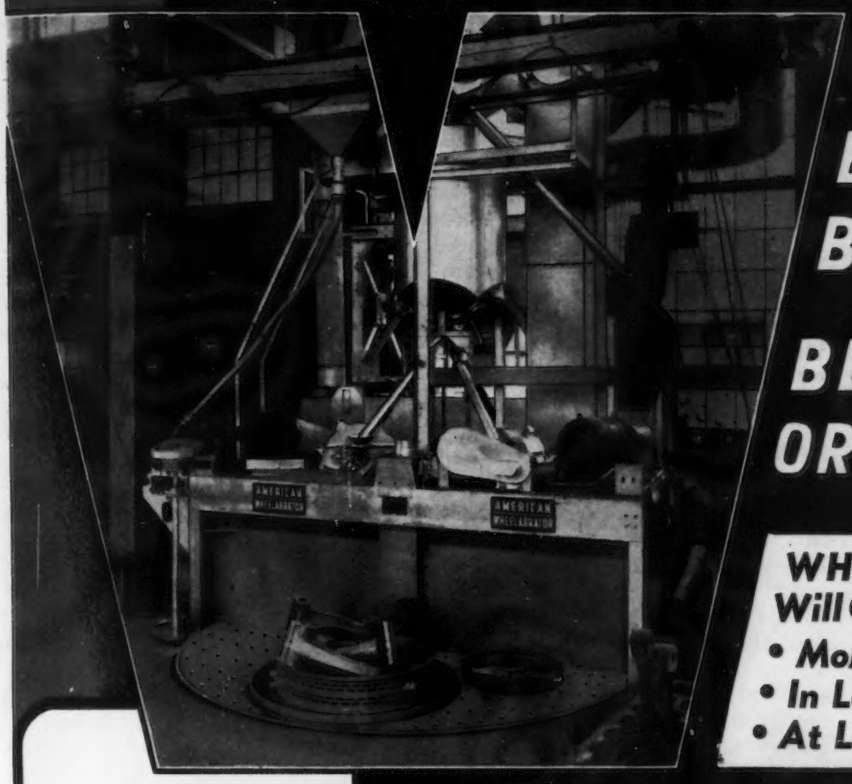
Sir:

It has been quite sometime since I subscribed for your valued IRON AGE and I just made up my mind to again indulge in the luxury of what I consider the most authentic reports of economic and general national welfare. I trust we will have the incomparable editorials of Mr. Van Deventer.

I'm just a mechanic, working as a sheet metal worker, but the $6 I pay for IRON AGE has always been a good investment. I am sure it will prove so again.

K. C. PHELPS
Pacific Avenue
Alameda, Calif.

SOMETHING YOU CAN BANK ON



WHETHER IT'S BOMBS OR BAYONETS ★ BEARINGS OR BILLETS

WHEELABRATING Will Clean Your Work
- **More Efficiently**
- **In Less Time**
- **At Lower Cost**

WHEELABRATING Brings You These ADVANTAGES

1. **High-Speed Cleaning** reduces costs, speeds up shipment of orders.
2. **Cuts Cleaning Costs** up to 50% and more because: it is faster, saves power up to 80%; saves labor; saves time in loading and unloading; saves space; saves abrasives; saves on operating and maintenance costs.
3. **Removes All Trace of Sand and Scale** down to the virgin metal, with the result that:
   - Machining and grinding are faster.
   - Tools last longer.
   - Inspection is simplified.
   - Hardness readings are accurate.
4. **Improved Appearance** — Wheelabrated products are bright, silvery, and uniformly clean.
5. **Provides Perfect Bond** for final finishing such as enameling, plating, galvanizing, painting, etc.
6. **Produces Wide Range of Finishes** from fine to coarse.
7. **Handles Wide Range of Work**—from fine springs to heavy armor plate, ideal for special and unusual applications.
8. **Eliminates Chipped and Rounded Corners**—only a minimum amount of stock need be allowed for finish machining.

★THE most logical approach to your cleaning problem undoubtedly lies in a consideration of one or more of these important factors: Better cleaning — Faster cleaning — Cheaper cleaning. That the WHEELABRATOR will give you all three of these is something you can "Bank on". You can prove this in two ways: (1) By actual test on your own product; and (2) by obtaining the comments of users — there are more than 1300 of them!

The "bankable" savings affected by this modern speed-cleaning process result from reduced tonnage costs, lower operating and maintenance costs, quicker inspection, improved machinability and grinding, and longer tool life.

Another big advantage in buying WHEELABRATOR equipment is the fact that you have a wider range from which to choose. Among the Tumblasts, for example, you can make your selection from seven popular sizes ranging from 1 cu. ft. to 30 cu. ft. load capacity. Multi-table machines are correspondingly complete in size range. Special Cabinets, of course, can be designed to fit any unusual or special cleaning problem.

AMERICAN FOUNDRY EQUIPMENT CO.
510 S. BYRKIT ST. MISHAWAKA, IND.

This Industrial Week . . .

o o o

LARGE sections of U. S. industry this week were being asked to give up their customary concern over what things cost and consider only the steps by which they can obtain maximum production of war goods.

At Detroit, for example, Ernest Kanzler, the new czar of the automotive industry's war production, warned this industry that costs are to be disregarded. Traditional methods of production may be sound but too "costly in time," he said. Speedy conversion to war output is the prime requisite.

At New York the Congress of Industrial Organization has just advised its affiliated unions to demand "substantial" wage increases, as well as the union shop, in forthcoming collective bargaining negotiations. A substantial pay raise, in the case of the SWOC, is the increase of $1 a day now being requested of some of the large steel companies.

With higher labor costs apparently inevitable, the railroads preparing to ask for an advance in freight rates and with the government advising industry to forget costs but to remember the OPA price ceilings, plants in the metalworking industry, large and small, are beset from all sides. Increasing taxes and difficulties of getting scarce materials and skilled labor are completing the steadily tightening ring. Some small plants are already fighting desperately to protect their own weakly-protected Corregidors.

Use Imagination, Kanzler Urges

One way to face the problems of war is to use one's imagination, Mr. Kanzler told a large meeting of automotive industry men. "We must use our imagination to do things faster, in a new way, to get out the production. All of us know, of course, that the actual physical job of putting the various resources of this industry, its skilled labor, its expert management, and its tools to war work has got to be done by the industry itself, by the men in it who plan and manage production and the men in it who operate the machines."

Among those who can already lay claim to being "imaginative" to a high degree in foreseeing and meeting war demands are the machine tool manufacturers who this week reported the unique fact that "most of the men (employees) making machine tools today had never seen the inside of a machine tool plant two years ago."

Because political backbiting and gouging in the now abandoned OPM multiplied difficulties in getting into war goods production, the metalworking industry this week watched the new War Production Board closely for clues as to its course. There was encouragement in WPB Chairman Nelson's warning to his staff that "neither past accomplishments or personal relationships count" in the Board's efforts to expedite war production.

No important changes in operations of the priority system of distributing material and equipment to war plants under the newly-organized WPB, seem likely at this time. C. H. Matthiessen, Jr. (of the Hawaiian Pineapple Co.), has been appointed to take charge of the bureau of priorities in the WPB Division of Industrial Operations. How this system of controls has expanded is shown by the scores of new orders listed in the new allocation and priorities guide, issued this week by THE IRON AGE.

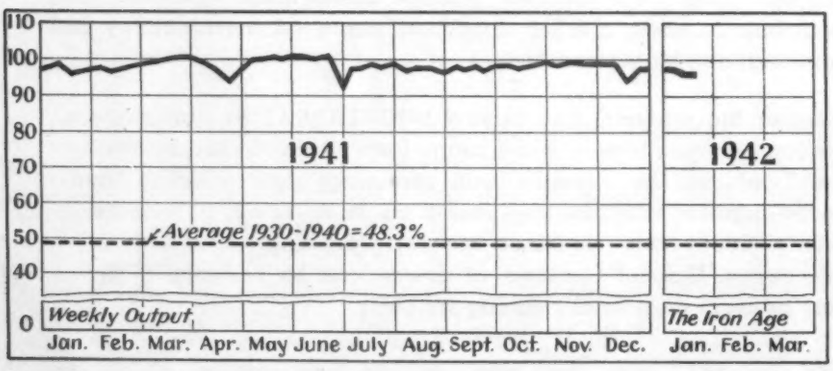
Drive on Violations Now a Possibility

An early report by the WPB on alleged priority violations within the steel industry is not an impossibility. Several weeks ago representatives of OPM visited various steel companies to check adherence to priority regulations. The visits were before Pearl Harbor.

Despite the stringency in scrap supplies, steel ingot production this week will gain a half point to 97 per cent, according to THE IRON AGE estimates. This week is the fifth consecutive 7-day period in which the rate has been below the 97.5 per cent level of the week before Christmas.

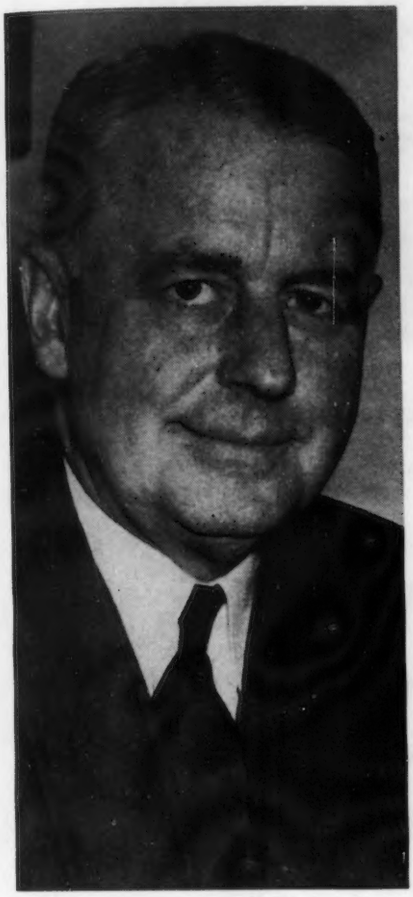
Chicago district operations gained a point this week to 103 per cent of capacity, while the Youngstown rate rose two points to 97 per cent. The St. Louis rate advanced 2½ points to 87½ per cent. Pittsburgh production is unchanged at 97 per cent, Eastern Pennsylvania at 97 and Cleveland at 91. Loss of a point to 101 per cent was recorded in the South Ohio River area while ingot output in the East declined

Steel Ingot Production—Per Cent of Capacity



Steel Ingot Production, by Districts—Per Cent of Capacity

	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S.Ohio River	Western	St. Louis	Eastern	Aggregate
Current Week.....	97.0	103.0	97.0	91.0	97.0	90.0	88.0	100.0	95.5	101.0	96.0	87.5	98.0	97.0
Previous Week....	97.0	102.0	95.0	91.0	97.0	90.0	88.0	94.0	95.5	102.0	97.0	85.0	103.0	96.5



J. S. KNOWLSON

Director of the Division of Industry Operations in the new War Production Board. (This division handles priorities.)

five points to 98 per cent. Detroit operations rose six points to 100 per cent.

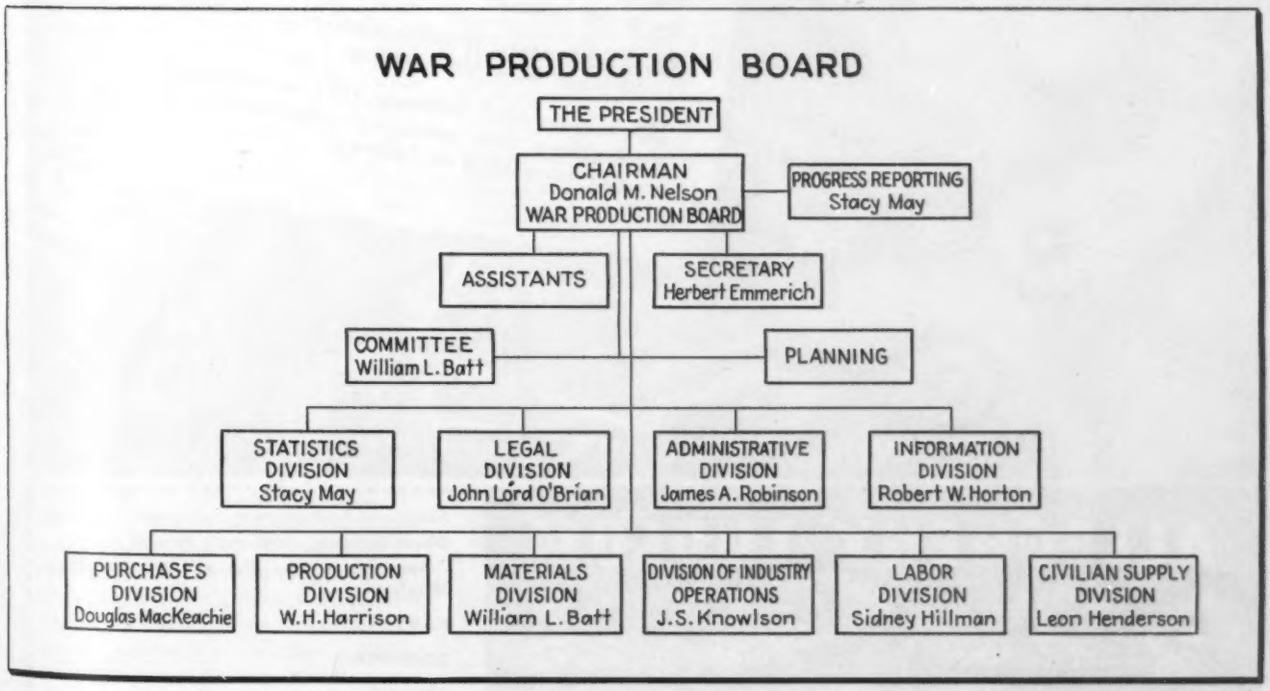
Tight Situation In Semi-Finished

The ever growing demand for steel plates is expected to draw an increasing share of semi-finished material from other steel product departments. Furthermore, the likelihood that lease-lend requirements will not only be doubled in the second quarter of 1942 over the first quarter, but will continue for some time to come, also points to additional tightness in semi-finished steel supplies. The sharp increase in demand for structural shapes and concrete reinforcing bars for construction of new war plants and the rehabilitation of damaged equipment will fall heavily upon the structural mills. Such factors lead to the conclusion that bar, pipe and sheet mills and some other units face curtailment in varying degrees in the months ahead.

For non-integrated steel mills, the situation is already grave. Some have already suspended operations. The heavy drain on semi-finished steel for allocation and high priority orders has been felt by some non-integrated sheet and strip mills whose supply of material had to be cut despite their heavy bookings of priority rated material.

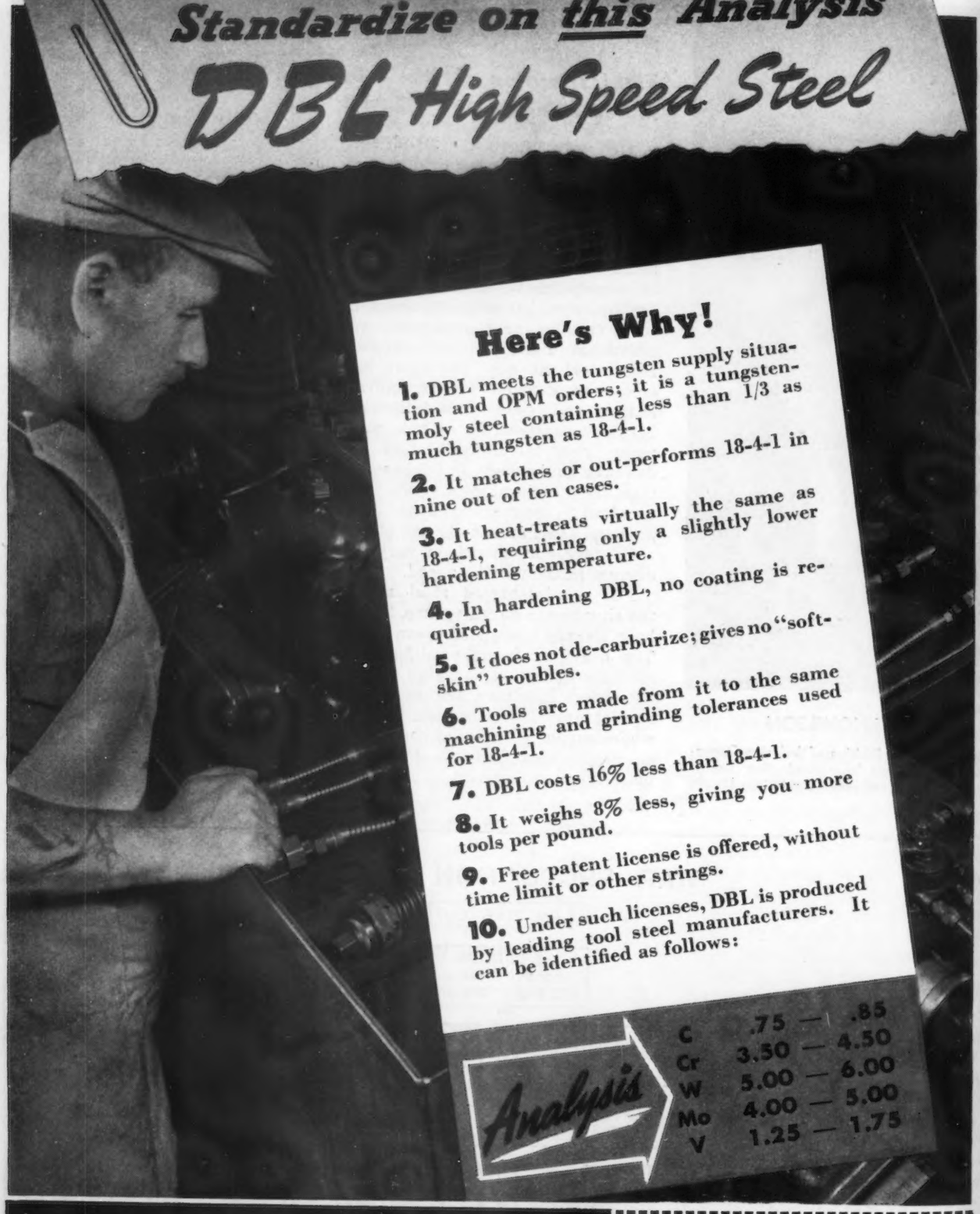
W. H. HARRISON

Chief of the War Production Board's Production Division. Mr. Harrison is on leave as vice-president of the American Telephone & Telegraph Co.



Standardize on *this* Analysis

DBL High Speed Steel



Here's Why!

1. DBL meets the tungsten supply situation and OPM orders; it is a tungsten-moly steel containing less than 1/3 as much tungsten as 18-4-1.

2. It matches or out-performs 18-4-1 in nine out of ten cases.

3. It heat-treats virtually the same as 18-4-1, requiring only a slightly lower hardening temperature.

4. In hardening DBL, no coating is required.

5. It does not de-carburize; gives no "soft-skin" troubles.

6. Tools are made from it to the same machining and grinding tolerances used for 18-4-1.

7. DBL costs 16% less than 18-4-1.

8. It weighs 8% less, giving you more tools per pound.

9. Free patent license is offered, without time limit or other strings.

10. Under such licenses, DBL is produced by leading tool steel manufacturers. It can be identified as follows:

Analysis

C	.75 — .85
Cr	3.50 — 4.50
W	5.00 — 6.00
Mo	4.00 — 5.00
V	1.25 — 1.75

ALLEGHENY LUDLUM
STEEL CORPORATION
PITTSBURGH, PA.
Tool Steel Division AL *Watervliet, N.Y.*

Allegheny Ludlum Steel Corporation T-202
Oliver Building, Pittsburgh, Penna.
Send me a copy of the "DBL Blue Data Sheet."

NAME_____
COMPANY_____
ADDRESS_____

News of Industry

Federal Financial Aid Needed in Scrap Drive, Survey Shows

• • • **Out of 337** opinions concerning the serious scrap problem offered by steel mills, foundries, and scrap dealers and brokers in THE IRON AGE'S national survey of representative concerns, 122 urged that remote and high cost scrap from farms, old plants, bridges and abandoned trolley tracks be hurried to consumers and 33 of these observers recommended that Federal aid be extended to defray part of the cost in junking old cars, tearing up trolley tracks and collecting other high-cost scrap, besides financially helping small "junkies" to stay in business. "Hoarding" was mentioned as an existing evil by 25 contributors scattered from coast to coast who referred to scrap owners refusing to sell to dealers at present prices, and 14 observers suggested Federal action be taken to compel sale of such scrap.

Public collection campaigns and national publicity were recommended in 33 replies, and detailed schemes were advanced for radio, publication, and billboard advertising with expenses absorbed by the government, the Scrap Iron and Steel Institute, the American Iron and Steel Institute, the American Foundrymen's Association, the NAM, and local clubs all over the country. General opinion leaned toward Federal field direction of a national collection effort by bringing "pressure, publicity and influence," to bear on the farmers, auto wreckers, industrial concerns, and average householders. Many scrap dealers want the public educated as to the real value of unprepared scrap, so that it cease asking for $20 a ton. Observers felt that the WPA, CCC, or Civilian Defense personnel might be used to recover scrap economically unavailable at OPM prices, while other ideas included appeals for contributions of scrap to the Red Cross or offers of payment in Defense Stamps.

The national campaign would permit recovery of high-cost scrap (regarded as necessary by 122 observers), and would substantially make up the loss to collections resulting from the declining number of pushcart peddlers in business. As part of this drive, a steel company executive suggests that floating gangs be organized to cut up and sort scrap in "auto graveyards", adding that perhaps auto manufacturers could furnish experts who could segregate the alloy from the carbon and the cast iron from the aluminum; that WPA workers and women could cut up old cars with torches, following pick-up, and other workers could pile the scrap for shipment. Payment from scrap dealers would defray part of the Federal expense and the purchase prices of the old autos. These floating gangs could go from town to town using trailers.

This drive might also seek out remote scrap mentioned in various suggestions, such as that of a California scrap dealer: "There is considerable scrap in lower California and Mexico, but . . . the Mexican government has an export duty of approximately $13 a ton. If our government could make some agreement with them to take off this duty . . ." A Pennsylvania foundryman writes, "There is an unlimited supply of scrap in the anthracite region of Pennsylvania which no one seems to gather up." A Washington State foundryman suggests, "we know of no source that can be tapped other than Alaska. While it would be quite expensive to bring scrap from the interior to shipping points in Alaska, there is a lot of scrap in this district. If tariff barriers were down a little, some scrap might be procured from British Columbia in Canada." In the same state a scrap dealer suggests that logging camps be looked over, while a California scrap dealer recommends investigating the oil fields. A Michigan foundry owner mentions he has seen in his travels "thousands of obsolete railroad locomotives and worn out box cars stored on sidings and terminal

RESULTS OF IRON AGE SCRAP POLL

SUGGESTIONS	Steel Mill Scrap Buyer	Foundry	Scrap Dealer and Broker	Total
National publicity and public collection campaign	2	18	13	33
Raise prices (no figure) to increase Scrap flow	3	23	9	35
Raise price up to $2 a ton	..	1	4	5
Raise price over $2 a ton	..	..	3	3
Charge FOB shipping point prices	..	1	6	7
Lower prices	0	0	0	0
Total Price Suggestions	3	25	22	50
Report of "hoarding" by scrap owners and request for some action	..	13	12	25
Force sale of scrap by producer	..	7	7	14
Speed up junking old cars	1	14	12	27
Speed up junking old equipment, bridges, etc	2	18	7	27
Speed up movement of farm scrap	1	6	6	13
Speed up recovery of old trolley rails	..	10	1	11
Collect other remote, high-cost scrap	..	7	4	11
Total High-Cost Scrap Ideas	4	55	30	89
Subsidize high-cost or remote scrap	2	12	2	16
Subsidize or aid the small "junkie"	1	6	10	17
Total Subsidy Ideas	3	18	12	33
Halt flow to non-defense consumers	..	6	1	7
Miscellaneous ideas	5	17	6	28
Total Suggestions	17	153	102	272
No Suggestions To Offer	1	6	1	8
CRITICISMS				
Disapprove scrap price regulations	2	11	9	22
Approve regulations fully	1	1	1	3
Price violations mentioned	..	6	4	10
Approve prices	1	1	0	2
Steel mills criticized for direct buying, raiding areas, etc	5	2	5	12
Scrap brokers criticized	..	..	3	3
Scrap dealers criticized	2	2	..	4
Other criticisms	1	8	..	9
Total Criticisms	12	31	22	65
Total Comments Analyzed	30	190	425	345

yards which will never turn a wheel again. Similar antiquated equipment probably is owned by steamship companies."

A Pennsylvania foundryman asks for "government subsidization of reclamation of scrap from dumps and other places where it is uneconomic for private enterprise to recover." Several foundries mention that in some foundries "quite frequently you will find types of scrap unsuitable for that particular foundry allowed to gather . . . although it could possibly be used at some other plant."

From Vancouver comes mention of street car systems abandoned and thousands of steel rails that have never been taken up. A Pennsylvania foundry operator hears that in many mining yards "there are abandoned mine car tracks which could be removed and sold as rerolled or scrap steel rails. . . Many of them cannot be touched due to legal proceedings. . ." A Michigan foundryman recalls, "a year or two ago while going through Manistee in northern Michigan we saw miles of street car tracks covered with tarvia. . ." A Texas scrap dealer writes that in south Texas "there are many thousands of tons of obsolete and worn out equipment lying in the oil fields. Many oil companies are loath, and some definitely refuse, to dispose of this material which has no value above the price of scrap. Some firms have even depreciated it on their books, yet refuse to scrap it."

There were 43 suggestions that prices be raised, of which 24 came from foundries, three from steel mills, and 16 from scrap dealers and brokers. Only three recommendations were for price increases over $2 a ton but most of those urging price increases, including scrap dealers, asked this action to keep the "junkie" in business. "Raise prices sufficiently to get the horse-and-wagon peddlers . . . again hauling in small quantities," writes a Wisconsin foundryman, while the vice president of a steel mill suggests, "Increase ceiling prices on scrap to make it profitable to collect it, or permissible to ship longer distances." A scrap dealer writes from Virginia, "the broker and dealer are all satisfied with the present price, but the canvasser and peddler, who bring the iron in, will not go out at the present prices, as they can make more money working in factories and on their farms." And an Ohio scrap dealer says, "Peddlers gathering scrap must have an inducement to prevent them from accepting jobs in defense industries and to allow them to meet rising living and operating costs. Since their price is based upon the dealer price for scrap, the dealer price must be increased."

Many supporters of higher prices wanted, at the same time, the OPA to boost prices the dealer must pay for unprepared scrap to insure that the increase will go to the "junkie" and not to the dealer.

No suggestions were made that prices be lowered, while only two approvals of OPA prices were received, besides three blanket approvals of OPA regulations. A leading steel company's scrap buyer observed, "An increase in prices might bring out small isolated tonnages . . . not sufficient to make any material improvement in the overall picture."

However, there were 22 criticisms of OPA regulatins, of which the following is typical: "The OPA has unquestionably faced a formidable task . . . Surely there could be found within the scrap industry's ranks men of intelligence, integrity — above selfish ends—who would have been eager to forego profit for the pride of national service, who could have formulated a workable approach to the subject from the very beginning, thereby obviating constant revisions and deliberations over interpretations of wordy regulations which by legal phraseology made uniform interpretations impossible. The elaborate regulatons intended to solve the problem have been so unwieldy as to be impracticable . . . there has been a pyramiding of complications rather than simplification of a complex problem. In war time, time is too precious for theoretical experimentation."

Other critics were bitter, with a Western foundryman stating, "Remove price ceilings or enforce present schedule. It is a joke." While a mid-western foundry owner outlines this experience: "Several weeks ago, government representatives visited our offices . . . We had been paying higher than ceiling prices to maintain maximum production on defense work. We were advised we should not henceforth pay more than ceiling prices, and have not done so since. The result is we are not getting scrap and are threatened with curtailment of operations. Someone else is getting the scrap from our local territory by evasion of the price ceiling. If the government cannot maintain the price ceiling, the regulations should be withdrawn, so that honest users of scrap may compete on equal terms with the evaders." A scrap dealer in a North Central state reports a similar experience with another OPA agent who has not been heard from since returning to Washington. Seven concerns urged f. o. b. origination point price.

To kill the incentive of hoarders awaiting price increases, several observers want the OPA to make it clear that prices won't be raised.

The bitter feeling that has been engendered by the OPA's price ceilings and restrictions was indicated by 20 sharp recriminations against certain groups for abnormal scrap dealings. Scrap dealers

Have You Seen the New Priorities Guide

This issue of The Iron Age contains the latest edition of the Allocation and Priorities Guide. First compilation of its kind to be offered the metal-working industry — back in September, 1941—the new edition of the guide, out this week, contains the latest information about priority orders and forms.

Each week The Iron Age prints full details about revisions in the priority controls under which the War Production Board is distributing scarce materials and equipment to defense and non-defense plants. Keep your guide and watch The Iron Age for the revisions.

For extra copies of the 20-page guide, write to The Iron Age, 100 East 42nd St., New York. Prices are:

1 to 10 copies	25c. each
11 to 100 copies	20c. each
101 to 300 copies	18c. each
300 or more copies	15c. each

and foundries took steel mills to task for direct buying, foundries were scored by the mills for price violations, while scrap dealers and brokers were bitterly criticized by foundries and mills as important contributors to the dislocation of the scrap flow. On the other hand, many mills and foundries had friendly comments to make about the scrap dealer and broker, like the Ohio foundryman who wrote, "allow the brokers a fair commission . . . no sensible businessman will handle a $20 item for 50 cents a ton." However, several foundries strongly recommended that production of non-essential steel products be halted completely, just as the non-defense activities of many foundries have been forcibly curtailed, to prevent scrap consumption by such industries. Of course, such action would intensify the hardships of many concerns rather than actually increase the over-all supply of scrap.

Sloss-Sheffield to Reopen Coal Mine Idle Since '31

Birmingham

• • • **Sloss-Sheffield Steel & Iron** Co., one of the South's principal merchant iron producers, will reopen its Bessie coal mine near here, idle since October, 1931.

Rehabilitating the mine, estimated to cost about $700,000, has been started and production is expected to get under way in from four to five months.

Employing some 300 men, the mine is slated to produce 1500 to 2000 tons of coal daily. Sloss now is operating two coal mines, Flat Top and Lewisburg.

Corporation Subsidiaries Set Mining, Shipping Records

• • • **United States Steel Corp.** subsidiaries established a series of all-time records in the production and movement of iron ore and in the shipment of limestone and coal during the 1941 season.

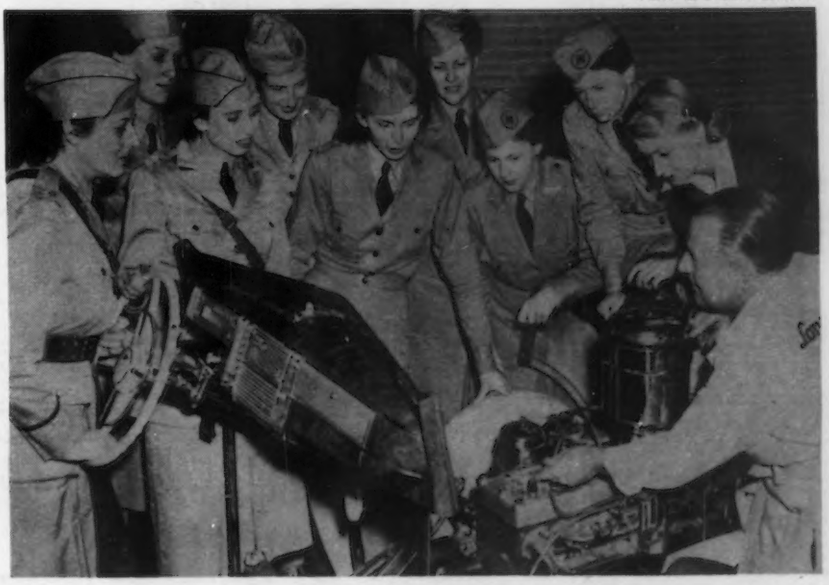
The Oliver Iron Mining Co. of Duluth, last year produced a record iron ore tonnage of 34,127,982 net tons compared with 26,193,055 net tons in 1940. Of this amount the vessels of Pittsburgh Steamship Co. brought to lower lake ports 23,542,751 gross tons. The Pittsburgh ships and other subsidiary vessels also carried 7,418,607 tons of limestone and coal.

Photos courtesy Linde Air Products Co.

NEW GUNS FOR OLD: Scrapping these 12 in. gun barrels from an old warship was accomplished at low cost through the use of oxy-acetylene cutting torches. The barrels are made of nickel steel and weigh 80 tons each. The upper photo shows the beginning of the operation, and the lower photo shows the barrels after the longitudinal cuts. These half sections were cut into quarters and then further reduced in size by cross cuts. Welded brackets support the guide track for the lengthwise cut.

WATCO'S STUDY MOTORS: Comparable to the active women's corps in Great Britain, are these "Watcos" (Women's Ambulance Transport Corps). Here a Plymouth service instructor is teaching a mechanical training class to a group of them.

Photo by British Combine



Auto Industry Gives Pledge to Kanzler

Detroit

• • • **The auto industry** met its new czar, technically the chief of the automotive branch of the War Production Board, at a meeting of 1100 automotive, supply, and tool and die plants here Saturday. The occasion was the first general meeting of the Automotive Council for War Production, called at Masonic Temple here at 9:30 a. m. and running through into mid-afternoon.

At the session, auto men heard keynote addresses by top executies of major companies and were instructed in the detailed plans that have been laid for an extensive industry-wide pooling of technical brains, machines, procurement information and management thinking.

The meeting was opened by Alvan Macauley, chairman of the Packard Motor Car Co. board, and president of the Automobile Manufacturers Association. A high degree of co-operation has existed for decades in the auto industry, he pointed out, but it can be "multiplied many times" for the war production program. "These are no new and novel 'teams' engaged in this work, but some that are already working," he said.

Macauley introduced Ernest Kanzler, appointed by Donald Nelson to his WPB post only a few days before. Kanzler's brief remarks included the statement that "my office can count on the maximum assistance of all the facilities of Government" (quoting Nelson). It was his only reference to the fact that he is, in reality, the industry's czar.

He told the manufacturers: "We must use our imagination to do things faster, in a new way to get out the production, even though it may cost more . . . All of us know, of course, that the actual physical job of putting the various resources of this industry, its skilled labor, its expert management, and its tools to war work has got to be done by the industry itself, by the men in it who plan and manage production and the men in it who operate the machines . . . At the same time we must all recognize that in time of war the government has the ultimate ersponsibility for the overall planning for the best use of our nation's resources."

Immediate decisions are needed, he added, on actual military requirements, and procurement policies. A most important decision was the one to do the automotive control job here in Detroit.

Referring to production in his concluding remarks, he again stressed the statement that costs were to be disregarded. Traditional methods of production may be sound, but may be too costly

SPECIAL TOOL SERVICES: Shown here is one of the forms being used by the Automotive Council for War Production to obtain from each shop in the industry such information as a complete list of its equipment, tool hours unassigned and available, and its machines not yet in use in war production.

Return Promptly to:
Machine Tool & Equipment Listing Service
Automotive Council for War Production
320 New Center Building, Detroit

Sheet No.....

TOOL AND EQUIPMENT LIST

Company..... Address.....

Representative to whom all inquiries for use, purchase, or lease of equipment should be addressed.....

SEE INSTRUCTIONS ON BACK

	Machine or Equipment Classification ("Lathe" "Milling Machine", Etc.)	Make	Type and Model	Size	Age (Year Built)	Standard Type (Check)	Special Type (Check)	(See Below) Assignment (1) (2) (3) (4) (Check)	Date	Location	Owner's Identification Number	Report Here All Changes In Status Previously Reported
1												
2												
3												
4												
5												
6												
61												
62												
63												
64												
65												
66												
67												
68												
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70												

KEY—Assignment: 1) Allocated to present war contracts or letters of intent, and date expected to go into production thereon.
2) Allocated to war contracts for which bids have been submitted but not yet accepted, and date when contract will be closed or lost.
3) Working on or assigned to authorized replacement parts production, and date to be released from such production.
4) Available at once for production, or sale, or lease.

Reported by..... Date.....

in time, he said. Speedy conversion to war output is the prime requisite.

K. T. Keller, Chrysler Corp. president, said to the audience, "We have spent too much time on 'black print', now let's get down to the blue prints that production people understand." He urged small manufacturers to "understand the 'pieces' and you'll be surprised at what can be done" at changing pieces to fit machines, if machines cannot be made to fit the pieces. He brought sample parts from a gun being made by Chrysler, to show how a forging had been redesigned as a stamping. The original specifications called for a forging, machined and profiled all over. 200,000 pieces per month were required. "You fellows know how many milling machines that would take," Keller said. Ingenuity will solve many tough-looking problems before summer comes, he predicted.

C. E. Wilson, General Motors Corp. president, said that in the present retooling of the industry it is just "bringing out new models". "You can't lick this job with mysterious words like pooling, conversion and subcontracting," he said. "There is no substiutte for sweat."

Remarks by O. E. Hunt, G. M. vice president, constituted a complete outline of the engineer's participation in all-out war, including advice to follow war products right up to the front lines to see that they operate properly.

Paul Hoffman, Studebaker Corp. president, asked the assembly to rise and pledge to Kanzler that the industry "will join forces and back him to the utmost limit".

R. G. Waldron, Hudson Motor Car Co. production department, and George Romney, managing director of the ACWP and the Automobile Manufacturers Association, presented details of the special machine and tool services being inaugurated by the Council. These are already underway and include the following:

1. TOOLING INFORMATION SERVICE. Each shop in the industry is being surveyed to report available capacity as follows: (a) complete list of its equipment; (b) tool hours available and unassigned. The same survey will record the needs for tooling on the part of companies engaged in war output. The Automotive Tool and Die Manufacturers' Association will handle this work.

2. MACHINE TOOL AND EQUIPMENT SERVICE. All firms in the industry are to report any machine tools or equipment not now in use on war production. Machines earmarked, but not in use, must be listed, along with data on time they will remain available. Even special purpose machinery is to be listed.

Private negotiations between owners of equipment and those desiring to use it will be necessary to put it into service, but the Council will bring the two together. There is no limitation on the kinds of equipment to be listed; even heat treating furnaces and foundry equipment are to be included, for example. It was stated that, of the 300,000 pieces of equipment believed to exist in the industry, about 150,000 would be listed as available for war service by others than the owners. Any war contract holder can use this service.

"Punch cards" will be used to make the information available, and to keep it up to date.

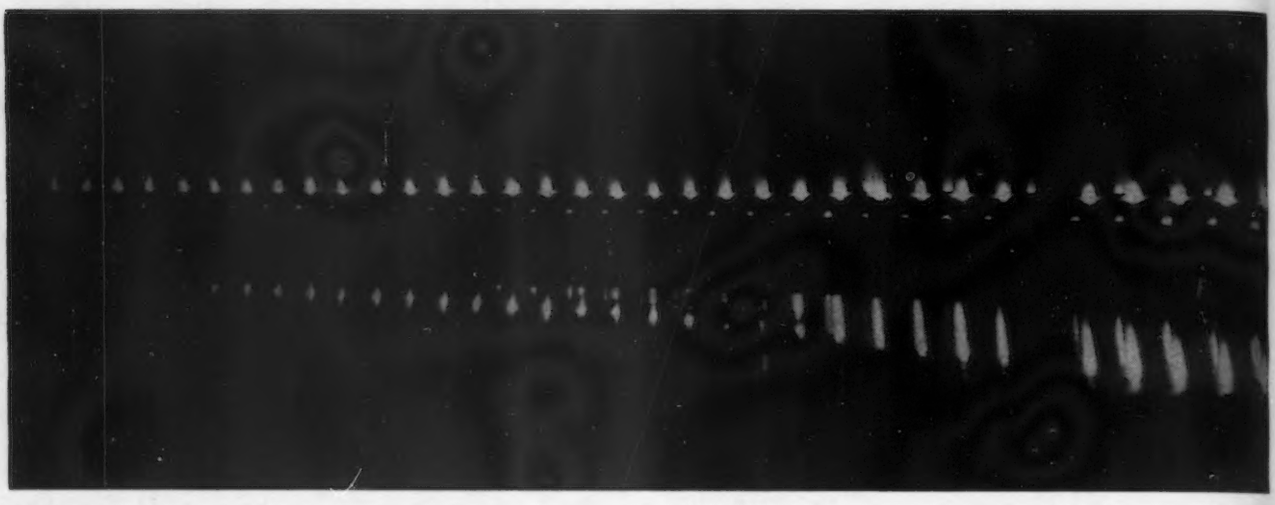
The afternoon session, under Clarence W. Avery, president of Murray Corp. of America, was telescoped into the morning session and carried on into the afternoon without interruption. He announced acting chairmen to take charge of various special Council activities, and then introduced the subject of work distribution, which was outlined by E. A. Clark, vice president of Budd Wheel Co. and C. C. Carlton, vice president of Motor Wheel Corp. and president of the Automotive Parts and Equipment Manufacturers' Association.

Clark addressed himself to the remote supplier who has already exhausted himself and spent considerable money on pilgrimages to Washington in search of war contracts. He advised them that the Council is an effort to "bring work to the machines" and to "introduce you to the mechanism for it and to introduce you to the procurement set-up." He added, that they now should send someone (not necessarily a salesman) to the designated contacts in the auto plants.

The designation of contracts in the auto plants is an important feature of the plan announced by the Council. "Shopping lists," announced by Carlton, carry information about new contracts awarded to automotive manufacturers and will have specific information on the sub-contracting to be done, machinery required, and the name of the "designated contact."

PLANE BREAKUP: A member of a British tank crew at El Adem, Libya, stands on his tank to break up a German plane captured on the airfield here. The city was recaptured by the British after one of the world's biggest tank battles, lasting several weeks in the Libyan desert.

International News Photo



THESE BEEHIVE COKE OVENS, which more than once in the last decade have been given up for dead, are very much alive today for national defense.

Beehive Coke Ovens Key to Success of Expansion Program

By THOMAS C. CAMPBELL

Pittsburgh

• • • **Given up as dead** several times in the past decade, beehive coke production will spell success or failure for the gigantic blast furnace expansion program now under way.

Although much of the pig iron expansion project will be supported by new by-product plants, an important part will depend upon the continuing supply of beehive furnace coke, the greater portion of which will come from the Western Pennsylvania Connellsville region.

Any factor or set of circumstances which might jeopardize the maximum flow of furnace beehive fuel is bound to retard the national war effort, according to expert opinion here. For that reason, realistic beehive coke operators are now laying plans to obtain additional coking coal when present veins have run out.

Originally beehive coke plants were situated at the coal mines but in recent years a large part of the coking coal utilized by independent beehive coke operators in the Connellsville regions has had to be trucked to the site of the ovens which has increased the cost of making coke.

With coal veins in important areas close to the beehive ovens slated to be worked out in from six months to three years, the long term outlook for independent beehive coke production involves anything but academic questions.

With a $6 a ton ceiling which many coke producers under present conditions would find to be no extreme hardship, those coke operators whose source of supply is running out, would do well to immediately make plans for presenting concrete and factual data on current costs as well as probable costs involved, in case they must go far afield for coking coal. Any hitch in laying the proper plans or in finding coal before present veins run out, may cause serious consequences later on, no matter how small the loss in production might be, according to analysts here.

According to opinion in the coke regions, the case of the small independent coke operator involves a comparison between him and some of the other producers whose supply of coal is not only at the ovens but also who have installed mechanical equipment for pulling the coke. It is said that producers who have coal adjacent to ovens and who have mechanical means of drawing the coke can no doubt make a profit with a $6 ceiling. A small producer, however, in most cases must truck his coal at a cost of about 35c. a ton, which means about 55c. a ton on a coke conversion basis. In addition to this, most of the small operators who, incidentally, taken as a group, produce no small tonnage of beehive coke, draw their coke by hand, and in this case the cost of converting coal to coke is roughly estimated at from 50c. to 60c. a ton greater than mechanical drawing.

It is argued by the small producer that this additional cost which ranges from $1 to $1.15 a ton on the coke, makes it difficult, if not impossible, to show a profit under a $6 ceiling. On the other hand, the OPA has definitely indicated that these small producers will be given opportunity to present their cost data but observers point out that while hearings are being had and the amount of paper work is increasing, some coke ovens may have to shut down because of the cost.

The outlook for continued production of beehive coke is far from gloomy, however, providing proper action is taken before production is interfered with, it is said here. There is a chance, however, that the OPM might have been overly optimistic when, on Nov. 1, 1941, it cited beehive oven production of approximately 7,300,000 tons a year as available for blast furnace production. Total beehive coke production in 1941 approximated 6,300,000 tons, according to the U..S. Bureau of Mines and an undetermined but not small part of this total consisted of foundry coke and other types which are not used in blast furnace operations. Analysis of these figures by informed sources here indicate

strongly the need for continuing the uninterrupted flow of beehive coke production of existing blast furnaces and those now under construction are to be maintained at maximum capacity.

The fact that beehive coke supplies are slightly easy at the present time may lull some interested parties into a false sense of security, especially in those cases where sudden and unanticipated demand for spot supplies may be injected into the market from time to time. The "ace in the hole" held by the OPM, however, is the coke production of the so-called merchant by-product ovens, whose present production rate of furnace coke approximates two and a half million tons a year, but whose capacity for total by-product coke production approximates sixteen million tons a year. It is believed that if a severe coke shortage would materialize in 1943, government officials would make no bones about commandeering or allocating merchant by-product coke if the supply of captive by-product coke and beehive coke was not sufficient. However, it is pointed out that location of supplies and hence high freight costs might be involved if such allocations were made.

At the present time approximately 11,000 beehive coke ovens are available for production in Western Pennsylvania with about 9,500 ovens actually producing material. Not all of the latter, however, is available for blast furnace use, there being some tonnage moving for domestic heating purposes as well as for foundry consumption.

Several large coke plants in the Connellsville district are rapidly reaching a point where present coking coal supplies will be run out. One unit may have to seek a new source of material by May of this year, while other important plants have only from one to two years supply of coking coal at the present rate of production. Many other smaller plants must find new coal supplies in periods ranging from one to two years and in most of these cases it is said such coal may have to come from West Virginia, even though there are some sources who believe that some domestic coal can be diverted for coking purposes.

The H. C. Frick Coal & Coke Co. at the present time produces or buys approximately 50 per cent of the beehive coke tonnage produced in the Connellsville region. While this company has long term plans set up to assure an uninterrupted flow of fuel to U. S. Steel Corp. blast furnaces now existent and those to be built in this district, the question of coking coal lands to some extent also remains a problem with them. Frick's total consumption is composed of plants operated by themselves as well as independent plants whose total output is taken by Frick.

The above factors involving the beehive coke industry are a definite indication and an argument as to why considerable caution and research should be taken before price ceilings are placed upon the industry, according to operators here. No small portion of beehive coke output is produced by operators who have to work pretty much "on a shoestring." The strategic importance of beehive coke production is found in the fact that the U. S. Steel Corp. plants in the Western Pennsylvania districts alone are dependent upon beehive coke supplies for about 20 per cent of their steel ingot production.

Scrap Collection Committee Named for New York City

• • • **New York City now has** a salvage committee which will function under the city defense council to stimulate and expedite the collection of scrap materials. Clarence H. Low, a retired executive in the rubber reclaiming field, will serve as voluntary chairman. Headquarters will be at 122 East 42 Street.

Tyson Expansion Begins

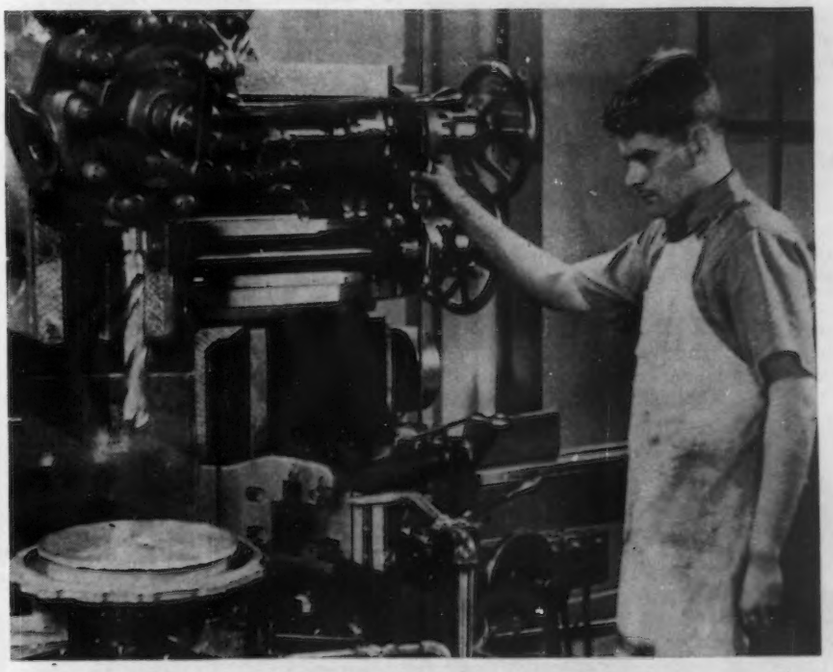
• • • **Ground has been broken** for a large new addition to the Tyson Roller Bearing Corp., Massillon, Ohio, manufacturers of tapered roller bearings. Ralph H. Maxson, president, said the expansion program would cost a third of a million dollars, and would be finished by April 1st.

Link-Belt Forms Subsidiary

Chicago

• • • **The Link-Belt Ordnance Co.** has been formed as a subsidiary of the Link-Belt Co. for armament production.

GOVERNMENT TRAINING: Shop training films, made by the Government, are being used to more quickly train shop workers and machinists for war production. Here is a shot taken from one of three sound films produced by the U. S. Office of Education on the use of the vertical boring mill and vertical turret lathe.

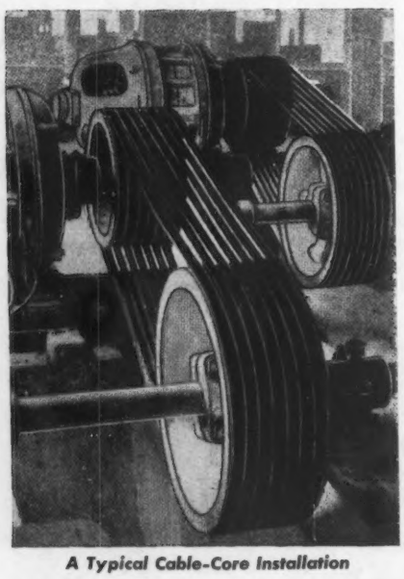


NEW Cable-Core V-BELTS

BLACK

WITH TOUGH *BLACK* JACKETS

4 REASONS *for SPECIFYING* CABLE-CORES



A Typical Cable-Core Installation

1—Black Jackets are Tougher

New, groove-gripping unit jackets of special flexible fabric filled with tough, live black rubber. Transmit maximum power from and to the sheaves. Give "All-Out" defense protection to the vital working parts within.

2—"Neutralized" Cable-Cores Defy Hard Work

Parallel "Cable-Core" construction places load carrying cable-like cords in the neutral section where deteriorating "flexations" are at an absolute minimum. "Cable-Cores" are composed of powerful fiber strands, specially woven and prestretched, then impregnated and imbedded in selected cool-running, slow-aging rubber compound. A 100% Tough Construction.

3—Built-In, Uniform Flexibility

Stretch-taking section above "Cable-Cores" is made of special extensible rubber compounds. Compression section below "Cable-Cores" is constructed to resist "crimpage" when belts are flexed around pulleys. All sections are consolidated into one balanced unit that will give you "POWER TRAVEL AT REDUCED RATES" — economical, trouble-free operation for top speed production.

4—Tailored to the Grooves

Belts are cured in precision molds to produce exact cross sections that will fit true in the sheave grooves. This positive "groove-gripping" is far more important than matched length if matched belts are to pull together.

THE MEDART CO.

MANUFACTURING ENGINEERS of ALL TRANSMISSION EQUIPMENT

3500 DE KALB STREET • ST. LOUIS, MISSOURI

Better Use of Plate Mills Recommended

Cleveland

• • • **Estimating that** at least 12,000,000 tons of steel plate will be required to meet war needs in 1942, Joseph Malborn, engineer, United Engineering & Foundry Co., Pittsburgh, told the Cleveland district section of the A. I. S. E. here that present strip mill capacity would have to be harnessed to the plate production effort if the nation's needs are to be met. Mr. Malborn estimated that present actual plate producing capacity is only about 6,000,000 tons, provided that such equipment is

See plate mill article on page 91.

efficiently used. He added that an additional 3,000,000 tons of plates must be rolled from present strip mill capacity immediately and this figure will have to be gradually increased to 6,000,000 tons. Mr. Malborn estimated that 25 of the present 28 wide continuous strip mills in the United States would be available to turn out 15,500,000 tons of strip steel ranging in widths from 30 to 92 in. wide.

On these strip mills, it is estimated that a little more than 3,000,000 tons of plate might be rolled with present available equipment, while various installations such as cooling beds, shearing and leveling equipment, which could be completed within a short time, might permit an additional plate output of almost 3,000,000 tons more. Mr. Malborn, accordingly asked that strip mill executives study their plants immediately in order to make possible swift change-over to plate production wherever possible. He emphasized that tonnage is needed immediately.

Mr. Malborn scored the recent inefficient use of plate mills, observing that he recently had seen a 100-in. plate mill rolling material only 48 in. wide by ⅜-in. thick, which might well have been rolled on a narrow strip mill. He bluntly stated that plate makers in this country have little to boast about aside from the Homestead mill, in comparison to the difficult tasks which are constantly being performed by English mill operators.

HOBBY SPEEDS WAR PRODUCTION: An air-cooled welder tip developed by Will S. Haughton, Lockheed Aircraft Co., leadman, to suit the needs of his hobby of making rifles and pistols in his home workshop found a ready place in production of war materials. The tip, called the "Aerobutor," is finned with Dural to carry off the heat and and keep the handle and mixing chamber cool, increasing tip life by 50 per cent.

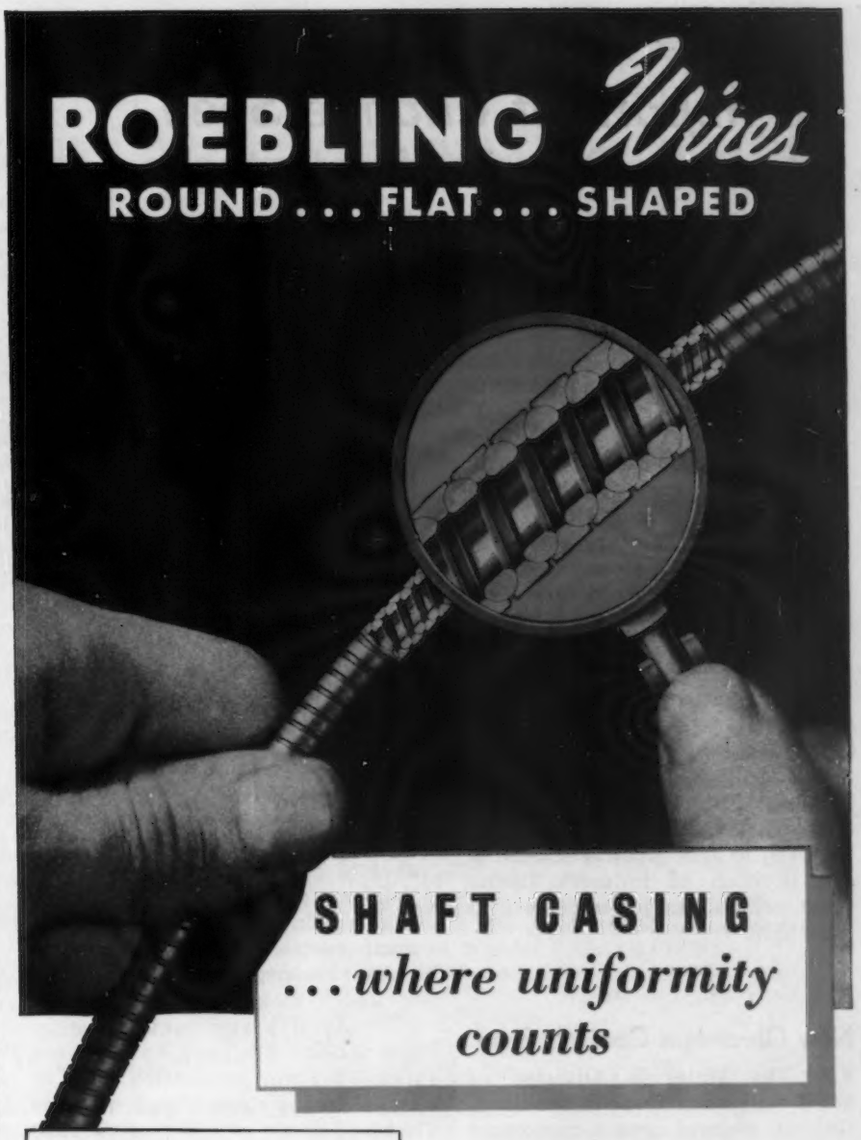
N. Y. Central Buying Cars and Engines

Buffalo

• • • **The New York Central** Railroad, which last year purchased 95 new coaches and 32 new stainless steel cars for its express service between here and New York, is preparing to take bids on additional cars and steam and diesel-electric locomotives. It is also reconditioning 175 steel passenger coaches.

Fairless Asks Employees To Watch for Saboteurs

• • • **Benjamin F. Fairless,** President of United States Steel Corporation, has called upon employees of the corporation and its subsidiaries to watch for sabotage and fifth-column activity. "While this is a patriotic duty," Mr. Fairless said, "it should be exercised with good judgment and without resort to unwarranted suspicion or unjustified accusations. The overwhelming loyalty of the American people is self-evident."



ROUND HIGH AND LOW CARBON COMMON AND SPECIALTY WIRES

Hard Drawn, Soft Annealed or Tempered, in all Finishes—Bright, liquor Finish, Coppered, Tinned, Galvanized.

FLAT HIGH AND LOW CARBON AND SPECIALTY WIRES

Hard Rolled, Annealed, Scaleless Tempered; Tempered and Polished, Tempered, Polished and Colored; Various Finishes—Bright, Tinned, Coppered, Hot or Electro Galvanized.

SHAPED WIRES

Various High or Low Carbon Shaped Wires such as: Shaft Casing Wires, I Beam Sections, Space Block Wires, Square, Keystone, Oval, Half Oval, Half Round, etc.

Shaft casing such as is used on speedometers or portable grinders calls for two distinct types of Roebling Wire. One—a soft steel triangular wire shaped like this ▼. The other—a high carbon steel "D" wire shaped like this ●.

Dimensional accuracy and uniformity of temper must be closely held in both wires. For when they are wound together into a casing the two wires must fit perfectly to permit free movement of the shaft or control cord, and yet be flexible and grease tight.

These wires may be supplied either plain or galvanized. Our galvanized coat is so adherent that it will withstand this severe forming without peeling or flaking.

This is a common application for the high quality Wire which Roebling makes. We are prepared to furnish wires to exacting specifications for all common and unusual applications.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY
Branches in Principal Cities

No Important Change Seen Likely in Priority System

Washington

• • • **Under the** reorganized WPB, the specific plan of operation of the priorities program has not been definitely worked out. Consideration is being given to the setting up of a Bureau of Priorities. C. H. Matthiessen, Jr., has been placed in charge of the priorities program and should the suggested bureau be established he would be its chief. Present indications are there will be no important, if any changes, either in method of operating the priorities system. Also there are not expected to be any extensive changes in personnel.

It is uncertain at this time whether Mr. Matthiessen will be delegated the power to sign limitation and other types of orders. If this power is not given to Mr. Matthiessen, it will in all probability be given to J. S. Knowlson, head of the Division of Industry Operations, which has jurisdiction over priorities.

New Chromium Controls Seen

• • • **The Materials Division** of WPB will soon issue a modification of general preference order M-18-A, paragraph (e), dealing with chromium, it is reported here. The first sentence of the new order will read, "Hereafter no person shall melt any chromium unless specifically authorized by the Director of Priorities." This does away with previously granted permission to melt less than two tons of ferrochromium without specific authority. The result will be to increase the volume of preference rating applications, but the step is considered necessary to WPB to tighten control over chromium use.

For possible late news on priorities see page 92.

No chromium of ferro-grade is being given for civilian uses at the present and all orders for military items must bear a rating of at least A-1-j or higher to obtain the material. However, chemical chrome is another matter, and, as the picture now appears, the more important civilian uses of chemical chromium such as dyes for the shoe industry, and uses of chromium in the textile industry, etc., will get sufficient amounts to operate as before.

Mining men in Washington say that this country has much low grade ore, which if developed, could supply United States needs. This opinion is shared by private engineers as well as by some government officials.

Nickel Order Tightened

• • • **Loopholes in priority** control of nickel by which some secondary metal and nickel already in inventory has been escaping into less essential uses were plugged last week by the WPB with the issuance of conservation order M-6-b. Primary nickel has been under control since May 15, 1941, but scrap restrictions have been less rigid. The order lists many items in which nickel can not be used after April 1 and contains other restrictions designed to conserve nickel for war production. Use of nickel in the items listed must be reduced to 50 per cent of a 1940 base period between Jan. 1 and Mar. 31.

Use of nickel, except were necessary for operation purposes, is prohibited in the manufacture of transportation equipment, plating, containers of all types, fire fighting equipment and lighter equipment. Substitutes must be used wherever possible.

Uses not specially mentioned in the order are limited to allocations of specific amounts of metal for a definite purpose. Stocks on hand will be taken into consideration and scrap will also be considered, in making such allocations.

Power Line Rated A-1-a

• • • **WPB has approved** a priority rating of A-1-a for a transmission line to be built by the Arka-La Electric Cooperative from Pensacola Dam in northeast Oklahoma to an aluminum plant being built at Lake Catherine, Ark. The dam is being operated by the PWA. The aluminum plant, which will have an annual capacity of 120,000,000 lb. is being built by the Aluminum Co. of America for the Defense Plant Corp. and will be government-owned.

Radio Output Cut 40%

• • • **To save 3400 tons** of steel, 750 tons of copper, 100 tons of aluminum, and 25 tons of nickel, the public will have to do with 40 per cent less radios during the first quarter of 1942, with sharper cuts in the offing. This was announced by the WPB last Saturday, as phonographs and radio phonograph combinations were ordered curtailed, too. The percentage of curtailment is based on the first nine months of 1941 ended September 30, 1941, for average monthly output.

Effective immediately, limitation order L-44, directs Class A manufacturers who sold more than $1,000,000 worth of radio sets and phonographs for civilian requirements during the first nine months of 1941, to reduce output by 45 per cent. Class B firms, whose sales are under this amount, must curtail production by 35 per cent.

Order P-43 Clarified

• • • **An interpretation** of the preference rating order P-43 granting priority assistance to research laboratories has been issued by WPB in order to make clear that the preference rating assigned cannot be used for construction or expansion of laboratory buildings.

Elevator Order Revised

• • • **WPB's Priorities** Compliance Section has substantially tightened the restrictions on the use of Preference Rating A-3 to make materials available for the manufacture of repair parts for freight and passenger elevators, escalators and dumbwaiters.

An amendment to order P-72, effective Feb. 1, extends for an indefinite period permission to use the rating for quantities and kinds

This Week's Priorities and Prices

Radio and radio-phonograph production for civilian use curtailed 40 per cent in Order L-44 issued Jan. 23. Number of tube sockets permitted also limited. (WPB-19)

Fluorspar producers requested not to exceed prices in effect Jan. 2. (OPA:PM2295)

Truck production (heavy and medium types) for March to be boosted 34 per cent over a year ago according to new WPB quotas. Bus and truck trailer output in March to be unlimited. (WPB-21). Makers of spare parts for these vehicles granted priority of A-3 for necessary materials in Order P-107 issued Jan. 22. Production quotas for such parts set in Order L-35 issued Jan. 22. (WPB-PM2286). Automobiles, trucks, trailers, etc., may be transferred if contract was entered into prior to 6 p. m., Jan. 1, according amendments to Orders L-2-f, L-1-c, L-3-e. (OPM-PM2259). Passenger car and light truck production to cease Feb. 1. (WPB-1)

Research laboratories may not use preference Order P-43 for construction or expansion of laboratory buildings, according to interpretation issued Jan. 23. (WPB-11)

Copper fabricators' observance of priority regulations to be studied by FTC investigators. Survey will cover 90 plants. (WPB-PM2283)

Elevator, escalator and dumbwaiter makers using Order P-72 to obtain priority assistance for repair parts for such equipment warned of tightening of regulations governing such use in amendment issued Jan. 22. Amendment also extends order to cover parts for Pan American nations. (WPB-PM2284)

Rubber and latex use subjected to more rigid controls in amendment to Order M-15-b issued Jan. 23. (WPB-4)

Electric transmission line to be built by Arka-La Electric Cooperative in northeast Oklahoma assigned preference rating of A-1-a. (WPB-9)

Defense housing critical area list enlarged by addition of Victorville, Calif., Carlsbad, N. M., and Brunswick, Ga. (WPB-13)

Nickel use further curtailed in a number of products by new restrictions placed on scrap and secondary metal in Order M-6-b issued Jan. 20. (WPB-PM2260)

Petroleum plants operating outside U. S. limits granted priority assistance in Order P-98-a issued Jan. 21. (WPB-PM2264). Petroleum maximum price schedule to be issued shortly, OPA announces. (OPA-PM-2307)

Asbestos from South Africa placed under strict priority control in Order M-79 issued Jan. 20. Use prohibited for civilian items. (WPB-PM2262)

New tires, casing or tubes can be sold to foreign governments under Lease-Lend Act only as part of official quotas, according to supplementary Order M-15-c issued Jan. 20. (WPB-PM2248)

Scrap dealer at Fort Dodge, Iowa, previously cited as a violator of price schedule No. 4 has agreed to abide by OPA schedule in future and has refunded sums collected by the company in excess of the schedule prices, OPA reports. (OPA-PM2269)

Coated and bonded abrasive products makers requested not to sell above level of Oct. 1, 1941. (OPA-PM2293)

Latin American countries to be given same protection under price ceilings as that accorded domestic buyers. (OPA-PM2304)

Window, plate and sheet glass makers agree to withdraw price increases announced Jan. 1. (OPA-PM2268)

Fuel oils, bunker C and No. 6, placed under a schedule of maximum prices in price schedule No. 72 effective Jan. 9. (OPA-PM2255)

New machine tool maximum price ceiling set in schedule No. 67 issued Jan. 21. (OPA-PM2267)

Magnesite, dead burned grain type, placed under a ceiling of maximum prices in schedule No. 75 effective Jan. 28. (OPA-PM2282)

Priority orders extended recently include: P-5-b to May 1, 1942, P-72 until revoked and following to March 31, 1942, P-3, P-4, P-9-a to P-9-g, P-13, P-15, P-16. (WPB-T-147 and PM2270).

Chemical plants assigned preference ratings varying from A-1-a to A-3 for repair, maintenance and operating supplies in order P-89. (WPB-35)

Ethyl alcohol order M-30 amended to indicate that order covers only industrial uses. Restrictions placed on quarterly basis. (WPB-18)

Mercury use sharply curtailed in order M-78 issued Jan. 23. (WPB-34)

Fat and oil processors permitted to fill contracts for finished products unless specifically instructed otherwise by WPB, according to an amendment to order M-71 issued Jan. 24. Order. The amendment also eliminates the three months' inventory restrictions. (WPB-38)

• • •

For copies of above announcements address defense agency concerned at Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB:PM2000 *means announcement* 2000 *issued by the War Production Board.*)

of materials specifically authorized under terms of the Production Requirements Plan.

The rating may be applied for materials for spare parts to be used in South and Central America and the Caribbean area, provided producers file separate PD-25a application forms covering these requirements for the three-months period specified. No producer may use the rating to obtain materials to replace an elevator machine which is beyond repair with a new machine or, unless required by Federal, state or local safety regulations.

Start Copper Plant Survey

• • • **A nation-wide,** plant-by-plant survey of some 90 primary fabricators of copper is to be instituted immediately by the Priorities Compliance Section, WPB has announced.

The inspection, the third to be conducted in the metals field, will be carried on by a force of attorney-examiners lent by the Federal Trade Commission for the purpose. These investigators have received special training from the Copper and Zinc Branch and the Compliance Section.

They will confer with company officials and make comprehensive studies of receipts of virgin copper and copper scrap, and of deliveries and inventories, to determine whether the fabricators have been operating in compliance with priorities orders.

New War Production Board Strives to Offset OPM Errors

Washington

• • • **The newly created War** Production Board takes up the job of marshaling raw materials, factories, management and labor to expedite the war effort with a minimum of civilian economy dislocation. The setup was referred to by Donald M. Nelson, Chairman, as a coordinated interim organization which would move without delay or debate to do the job in which OPM failed.

The War Production Board consists of a Requirements Committee with William L. Batt as Chairman and six main divisions which will report directly to Mr. Nelson.

The divisions and their heads are:

Industry operations — James S. Knowlson.

Purchases—Douglas McKeachie.

Materials—William L. Batt.

Production—W. H. Harrison.

Civilian Supply—Leon Henderson.

Labor—Sidney Hillman.

There is to be a seventh division to carry out the policies of WPB in the field. Progress Reporting, Planning, Statistics, Legal, Administrative, and Information divisions were set up in addition to the major divisions.

Whether WPB, whose organization Chairman Nelson said was not a revolutionary change, will avoid the pitfalls OPM did not, remains to be seen. Mr. Nelson's conception of the job which he said was to direct and not to administer, is to get Army, Navy, and other governmental agency cooperation. He said that if he failed in this assignment he would "step down and out of the picture, and not hang around."

Mr. Nelson made one thing clear, his Branch chiefs are to be clothed with every bit of the power in doing their job which the President had delegated to him by executive order.

OPM lacked legal authority to compel governmental and industrial cooperation. Internally, it was confused and uncoordinated, with two heads but no real head as no adequate authority had been delegated by the President. Industrialists had to learn the job of government. The organization was new. There were fights on the basic conception of the job between politicians and industrialists both in and out of the government, with certain groups seeing the war as a chance to further the aggrandizement of labor by giving it a hand in management. Petty jurisdictional quarrels arose among minor officials and there was a great lack of actual coordination between the various divisions.

Now Mr. Nelson has apparent authority and is not hampered by an impotent SPAB. The crux of the reorganization seems aimed at coordination. The personnel of the organization is older in government experience, but fear has been expressed that the political feuding will likely still go on.

HOW TO MAKE 120,000 TANKS and 185,000 PLANES with 50% Savings in machining costs

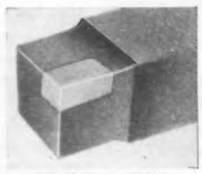
KENNAMETAL The Accepted STEEL CUTTING CARBIDE

$76,782,711,400 has been set aside for defense expenditures during 1942 and 1943. A large part of this huge outlay will be spent for the production of 120,000 tanks and 185,000 airplanes requested by the President.

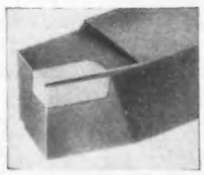
Because KENNAMETAL is used so extensively for turning, boring, facing, and shaping steel parts for these planes and tanks, machining costs will be greatly reduced. For KENNAMETAL tools will often cut production time in half—as compared to high speed steel tools—and their high wear resistance results in longer tool life, therefore less tool costs.

KENNAMETAL is also being widely used for machining shells, rifles, parts for anti-aircraft guns and other armament. You can do your part to make sure that our record war budget is used most efficiently by specifying KENNAMETAL on your steel-cutting jobs. Write for our Catalog No. 42 listing specifications of standard tools.

STYLE 21 TOOL



STYLE 3 TOOL

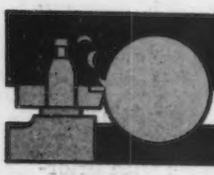


STYLE 11 TOOL

Record Sales Permit Price Reductions

You need pay no extra to use the *best* steel-cutting carbide tools—KENNAMETAL costs no more than other carbides. Write for the new KENNAMETAL Price List No. 7, effective Jan. 5, 1942.

SALES REPRESENTATIVES FROM COAST TO COAST



McKENNA METALS Co.

251 LLOYD AVE., LATROBE, PENNA.

FOREIGN REPRESENTATIVES: U. S. STEEL EXPORT CO. (Exclusive of Canada, Great Britain and Possessions)

Canadian Agent: Kennametal Tools & Mfg. Co., Ltd., Hamilton, Ont.

Freight Rate Question Up; More Price Ceilings Fixed

• • • **Effects of** a blanket 10 per cent advance in railroad freight rates were being weighed in advance last week when it became known that the carriers expect to lodge an appeal with the Interstate Commerce Commission. If an advance is granted it may not be that large, however.

In the steel industry an advance would tend to increase "dislocated tonnage" areas, particularly in regard to heavy hot rolled sheets. Pig iron producers on the long haul would face the necessity for more absorption. Higher rates might tend to lessen the volume of scrap available to dealers, and would add to foundry costs since foundry grades of scrap are on a shipping point basis.

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• • • **Much study** has centered on Price Schedule 49 (resale of steel) following the Steel Warehouse Association's recent appeal for relief. Some authorities in the East held that little could be done toward amending the order without creating additional complications, and expressed the view the only solution might be the establishment of fixed profit levels above mill price schedules.

Schedule 49 presents the very real danger of established prices being undermined in a given area by remote resale shipments, it was pointed out.

Meanwhile, the Export Managers Club of New York on Jan. 20 urged that export prices be specifically exempted from price control except as such regulation is exercised by the Office of Export Control, and not by the OPA.

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• • • **OPA is reported** working on plans to impose a price ceiling upon the bolt and nut industry, but the effort faces difficulties in view of the thousands of different types and sizes of products that the industry offers for sale. If periodic reports are requested, the paper work for the industry and the OPA will be tremendous. The handling of "extras" on certain sales will also pose a difficult problem for the enforcers of price ceilings. However, regardless of the hurdles, the OPA is expected to issue price ceilings in the near future. The date at which prices will be "frozen" is uncertain.

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• • • **Leading producers** of brass and bronze ingots last week were reported to have accepted OPA's suggested price levels (IRON AGE, Jan. 8, page 79). Feb. 1 was specified as the deadline for producers to devote to consideration of the proposed schedule.

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Petroleum Schedule Slated

• • • **A formal** price schedule will be issued soon covering petroleum and petroleum products, OPA announced Jan. 24. The schedule will follow closely the general letter to the industry sent from OPA Jan. 17, establishing maximum prices for refined petroleum products at levels prevailing Nov. 7, 1941, and for crude oil at prices prevailing Oct. 1, 1941. Excluded from the schedule will be carbon black prices, which are governed by existing agreements with OPA.

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Flourspar Stabilization

• • • **In a letter** sent to them last week by Price Administrator Henderson, fluorspar producers were asked not to publish, quote prices on, nor sell this non-metallic mineral at above their prices in effect Jan. 2, 1942.

In the event that any fluorspar producer considers it necessary to increase prices above the Jan. 2 level, it is requested that OPA be notified one month in advance of the date upon which the intended increase would take effect. In conjunction with any such proposed increase, Mr. Henderson asked that a detailed factual statement of reasons believed by the producer to justify the proposed increase, including financial data, be submitted.

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Action on Forgings Prices

• • • **At a meeting** on Monday, Jan. 26, manufacturers of open die steel forgings were asked by OPA not to raise prices above those prevailing on Oct. 10, 1941. The meeting was attended by representatives of companies producing more than 80 per cent of the dollar value of the open die production.

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Stainless List Revised

• • • **Carnegie-Illinois Steel Corp.** has issued a list of USS stainless steel base prices as of Jan. 1, 1942, with prices subject to change without notice. Several grades have been eliminated, among which are standard type No. 312, 315, 327, 418, 438, and 439. These prices represent no change from those in effect in the last quarter of 1941. Previous price lists have always indicated that announced base prices would be effective for shipments in the quarter named with prices subject to change without notice. The distinction, however, between the two lists is academic in nature since the company has already notified its customers that the base prices as of Jan. 1 would rule on shipments made during the first quarter, covering orders taken at that price.

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Action on Abrasives

• • • **Manufacturers** of coated abrasive products and bonded abrasive products were asked Jan. 23 by OPA not to publish, quote prices on, nor sell their output at prices above those each manufacturer had in effect Oct. 1, 1941. This request, made in letter form, applies to all such items sold by these manufacturers, whether part of their regular line or a specialty.

For late news on prices see page 92.

If a manufacturer considers it necessary to increase prices over those in effect Oct. 1, OPA requests that it be notified one month in advance.

Coated abrasives include sand-

Improve Your Safety Record *with good chain carefully maintained*

One of our customers has followed this straight road to better safety records:

The company has standardized on AMERICAN CHAIN.

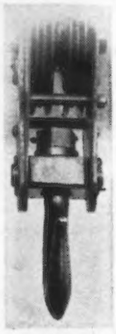
The capacity of each chain is indicated by the color of the hook or pear. Green for 25-ton chain, yellow for 20-ton, red for 2-ton—and others.

Colors and corresponding capacities are painted on the leg of the chain rack.

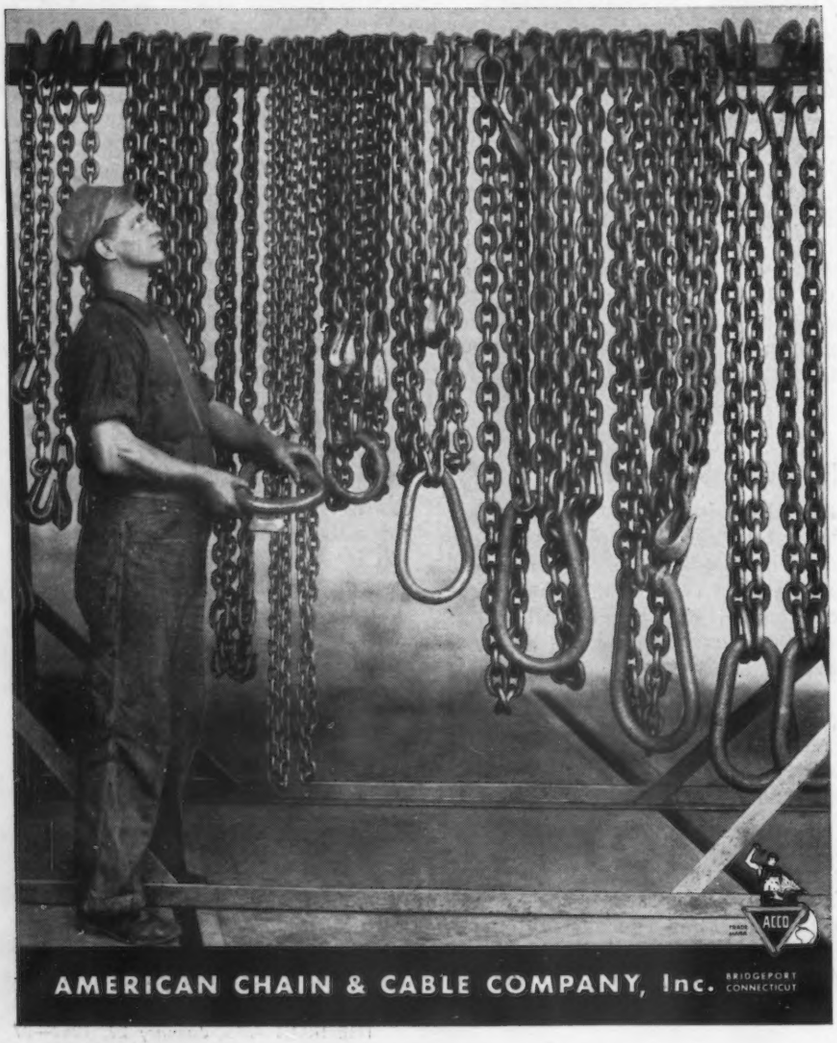
Check-ups are frequent, repairs prompt.

These and similar precautions will increase the service life of sling chain. We'll back this vitally important program with the best chain we've ever built.

This way of handling chain also saves time in putting chains away and locating them for the next job. Stored this way chains are easy to inspect and maintain.



AMERICAN CHAIN DIVISION • YORK, PENNSYLVANIA



AMERICAN CHAIN & CABLE COMPANY, Inc. BRIDGEPORT CONNECTICUT

Nelson Thankful OPA Handles Prices

• • • At his press conference Jan. 21 covering policies, procedures and aims of the new War Production Board, Donald Nelson made it clear that "price administration does not fall within our province — Thank God!" Rationing will continue to be handled by OPA, he said.

paper, garnet paper, flint cloth, aluminous oxide cloth, etc. Price rises late last year are reported being studied by OPA.

Bonded abrasives include grinding wheels, honing sticks, sharpening stone, etc. No significant change in bonded abrasive product prices has been reported in the past year.

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Latin American Controls

• • • Latin - American republics will be extended the same price protection as is provided domestic buyers, OPA announced Jan. 24.

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Other New Price Schedules

No. 72—Bunker C and No. 6 Grade Fuel Oil, East and Gulf Coasts; effective Jan. 9; announced Jan. 20. (Prices listed in THE IRON AGE, Jan. 15, page 81.)

No. 73—Temporary maximum prices on fish meal; effective Jan. 20; announced Jan. 17.

No. 74—Temporary ceilings on animal product feeding stuffs; effective Jan. 20; announced Jan. 20.

Schedule No. 76—Maximum prices for 14 grades of hide glue effective Jan. 28. They are lower than current market prices. Prices of hide glue stock were frozen under Schedule 68.

Voluntary Price Actions

Window, plate and sheet crystal glass makers agreed to withdraw recent price increases, OPA announced Jan. 21.

Homer Laughlin China Co., Newell, W. Va., has withdrawn price increases on all its lines pending studies by OPA.

Retail coal dealers in Washington, D. C., and vicinity voluntarily reduced prices 25c. per ton on all grades and sizes Jan. 23, in response to an OPA request.

Universal Engineering Co., Ltd., Los Angeles, voluntarily has withdrawn its request made about a month ago to OPA for a 15 per cent price increase on oil well bits.

Other Price Amendments

Schedule No. 7—Amendment No. 6; Combed Cotton Yarn; effective Jan. 14; issued Jan. 21.

Schedule No. 16—Amendment No. 3; Raw Cane Sugar; effective Jan. 26.

Schedule No. 35—Amendment No. 4; Carded Grey and Colored Yarn Cotton Goods; covers Osnaburgs; effective Jan. 23.

Schedule No. 58—Amendment No. 4; minor adjustments to wool yarn prices; effective Jan. 20.

Schedule No. 59—Amendment No. 1; Kapok prices adjusted to aid Netherlands sellers; effective Jan. 20.

Each Schedule Filed At Iron Age Office

• • • **A file copy of each formal price schedule is kept at the office of THE IRON AGE, 100 East 42nd Street, New York. Inquiries which can be answered for subscribers by reference to these price schedules are invited.**

New Machine Tools and Extras Placed Under Price Control

• • • **Maximum prices** on new machine tools and extras at levels prevailing Oct. 1, 1941, were established formally Jan. 20 by OPA in Price Schedule No. 67 which applies to all machines for the cutting, abrading, shaping and forming of metals, including presses.

The new schedule forbids the sale by dealers or manufacturers of new machine tools or extras on and after Jan. 20, 1942, at prices higher than the Oct. 1, 1941, list prices. If there was no list price on Oct. 1 the maximum price is the last price at which a similar tool or extra was sold between Jan. 1 and Oct. 1, 1941.

If the new machine tool or extra had no list price on Oct. 1 and was not sold between Jan. 1 and Oct. 1, 1941, the maximum price will be the price on Oct. 1 of the most nearly comparable machine tool or extra produced by the same manufacturer, "adjusted to reflect increases or decreases in cost resulting from significant mechanical differences." Thirty days before delivery of the machine a full description supported by cost data must be filed with OPA. The price thus submitted shall be the maximum price unless OPA objects within 15 days after receipt of the information.

Existing price arrangements in outstanding contracts between machine tool makers and the Army, Navy, Defense Plant Corp., Treasury procurement division or any other agency of the United States are not disturbed by the new schedule. Deliveries under all other contracts, however, must conform to the new maximum prices. Upon deliveries nine months or more from the date of the contract, the schedule permits the inclusion in such contracts of

Less Fatigue • Power Driving • Fewer Operations = 50% Less Assembly Cost with Phillips Screws

Yesterday — slow, painstaking slotted screw driving with plenty of muscle and plenty of care to see that the driver blade stayed in the slot. Plus plenty of time per assembly charged on the cost sheet.

Today — fast driving with the Phillips Screw that clings to the driver and prevents driver slippage. Faster driving methods are safe — more jobs where electric and pneumatic drivers can be employed. In the average case, Phillips Screws cut assembly time *in half!*

Add up the savings—this 50% reduction in time, the better work done by men less fatigued, the elimination of extra operations (including refinishing scratched surfaces), the freedom from crooked screws and split screw heads—and you'll find you have a 50% saving in assembly *cost* as well as valuable assembly *time*.

Please your men and your cost accountant by changing to Phillips. They are easy as pie to drive — and make every assembly dollar do twice the work.

Any of the firms listed below will tell you more

PHILLIPS RECESSED HEAD SCREWS GIVE YOU 2 for 1 (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

U. S. Patents on Product and Methods Nos. 2,046,343; 2,046,837; 2,046,839; 2,046,840; 2,082,085; 2,084,078; 2,084,079; 2,090,338. Other Domestic and Foreign Patents Allowed and Pending.

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N.H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N.Y.
Pawtucket Screw Co., Pawtucket, R.I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N.H.

SPRINGS
from
Holly
FOR EVERY MECHANICAL NEED
COIL SPRINGS FLAT SPRINGS LOCK SPRINGS
SPECIAL SPRINGS WIRE SPECIALTIES
SNAP RINGS WIRE FORMS

We make springs from every type of wire up to and including three-eighths diameter. We pledge rigid adherence to your specification. Get our quotation on your next job.

AMERICAN SPRING
AND MANUFACTURING CORP.
Holly, Michigan

a provision giving the seller the benefit of any change that may be made in the ceiling prices prior to the date of delivery.

All manufacturers are required to file with OPA by Feb. 15 complete lists of maximum prices as determined by applying the provisions of the schedule.

On or before April 1 every maker is required to file a certified balance sheet and profit and loss statement for 1941, duplicates of the statements filed with the Bureau of Internal Revenue for income tax purposes.

Ceiling on Beehive Coke

• • • **OPA on Monday,** Jan. 26, fixed the price of beehive furnace coke at the generally prevailing level of $6, Connellsville, Pa., ovens. As yet no price has been fixed on beehive foundry coke, which is only

See coke oven story, page 80.

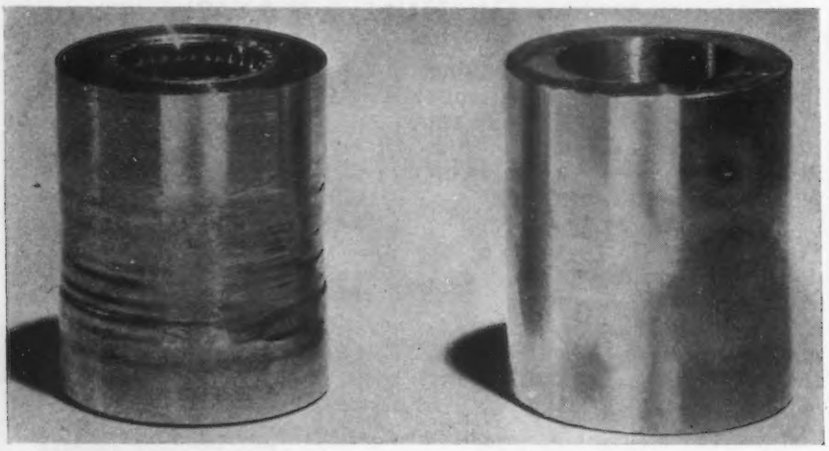
a small part of beehive production, but it is expected that a differential on the 72-hr. coke will be fixed. The beehive schedule is No. 77, effective Jan. 26 on all shipments after that date.

OPA also is about to issue a revision of prices on foundry by-product coke.

Magnesite Prices Set

• • • **Effective Jan. 28,** ceiling prices are established for the grades of dead-burned grained magnesite which are used for refractory material in steel furnaces. The maximum prices, established by Schedule 75, for carload quantities of maintenance grades of domestic dead-burned grain magnesite in bulk is $22 a ton, f. o. b., Chewelah, Wash.

A delivered price in excess of the maximum f. o. b. Chewelah price may be charged, consisting of such maximum price plus railroad freight from Chewelah to the point of delivery designated by the purchaser. A maximum price for carload quantities of the product in bags or sacks also is established at $4 above the ceiling price for magnesite sold in bulk. The maximum price as established by the schedule is the price which has prevailed for three years.



Better than 9 to 1 Increase In Life of Steel Mill Guide Rolls!

A hardened tool steel guide roll shown at left is badly worn after only 10 days' operation. At the right you see a guide roll cast from "Coast Metal" which still has a good surface after 90 days' operation.

You can effect economy by using "Coast Metals" Hard-Surfacing castings or weld rods for maintenance of mill equipment to secure much longer life and reduction in replacement shut-downs.

Desirable territories for distribution of Coast Metals are available.

COAST METALS, Inc. 1006 McKinley Ave. S. W. CANTON, OHIO

Use Plates from Strip Mills, Plea From Washington

Washington

• • • **WPB's Iron and Steel Branch** on Tuesday at a press conference made a plea to all consuming industries which can use plates 72 in. and narrower from continuous strip mills to do so.

J. V. Honeycutt, of the branch, said there are facilities for producing about 950,000 tons of plates monthly, 350,000 to 400,000 tons from sheared, 150,000 tons universal and 400,000 tons from strip mills. The branch spokesman, represented by A. J. O'Leary, Joseph L. Block, Stanley Adams and Mr. Honeycutt, said the branch was depending upon patriotic motives to make this shift in the use of plate widths.

Stanley Adams pointed out that sheared mills whose capacity for producing plates of 90 in. and wider was limited to 226,000 tons monthly were the controlling factor in the war effort and that the President's program imposed a burden of practically 250 per cent of capacity per month.

The 22 continuous mills and their 11 operating companies which are to shift to plate production are:

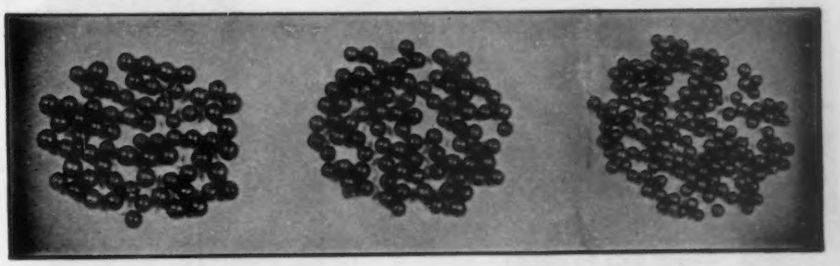
	Maximum Gage	Maximum Width, In.
American Rolling Mill Co.		
Middletown, Ohio	¼	60
Ashland, Ky.	⅜	51
Bethlehem Steel Co.		
Sparrows Point, Md.	¼	48
Lackawanna, N. Y.	⅜	72
Carnegie-Illinois Steel Corp.		
Dravosburg, Pa.	⅜	73
Gary, Ind.	⅜	73
Gary	⅝	30
McDonald, Ohio	⅜	36
Granite City Steel Co.	1	84
Great Lakes Steel Co.		
Ecorse, Mich.	⅜	90
Ecorse	⅜	30
Inland Steel Co.		
Indiana Harbor, Ind.	⅝	72
Indiana Harbor	½	42
Jones & Laughlin Steel Corp.		
Pittsburgh	⅝	90
Otis Steel Co.		
Cleveland	¾	72
Cleveland	½	26
Republic Steel Corp.		
Cleveland	⅝	90
Warren, Ohio	¾	36
Warren	1½	11
Wheeling Steel Corp.		
Steubenville, Ohio	¼	48
Youngstown Sheet & Tube Co.		
Youngstown	¾	72
East Chicago, Ind.	⅞	48

HERE'S LIFE EXTENSION FOR CUTTING TOOLS

When you can't buy all the cutting tools you would like you can be thrifty by extending the life of the tools you now have. To do this you need plenty of good coolant. Production men and machine tool builders have found that it is thrifty to use "Gusher Coolant Pumps." They deliver the coolant to the cutting tools in a split second.

There are no packing glands to bind or adjust—No priming. Any rate of flow from a trickle to a gusher is instantly available three shifts a day, every day. Specify Ruthman Gusher for coolant pumps.

The RUTHMAN Machinery Company
CINCINNATI, OHIO, U.S.A.
1821 Reading Road



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

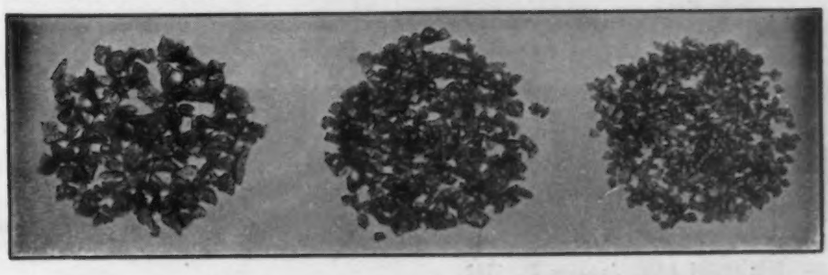
The unprecedented demand for our—

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION
MANCHESTER, NEW HAMPSHIRE

HEAT-TREATED STEEL GRIT



WPB Production Unit Absorbs Contract Distribution Staff

Washington

• • • **William H. Harrison,** head of the WPB Production Division, has announced that all facilities that can be useful in producing the war materials needed by America's fighting forces will be brought into operation under the new organization. He said he saw in the consolidation of the functions of the contract distribution staff with the production division staff of WPB "a great opportunity to broaden the base to get the job done."

"In gearing the productive machinery of the country to turning out the ships, planes, tanks and guns ordered by the President, there is no difference between prime contractors, sub-contractors and sub - sub - contractors," Mr. Harrison said.

Maker of Electric Tools Withdraws Price Advance

Washington

• • • **The Black & Decker** Mfg. Co., Towson, Md., has withdrawn price increases made as of Dec. 15 1941, and is issuing new price lists based on Oct. 1, 1941, levels at the request of OPA, it was announced on Tuesday, Jan. 27.

U. S. Steel Corp.'s 1941 Earnings $116,019,518

• • • **U. S. Steel Corp.** and its subsidiaries this week reported for 1941 net earnings of $116,019,518 after taxes, interest and depreciation, compared with $102,181,321 in 1940. Fourth quarter net earnings totaled $20,331,427. Finished steel shipments for 1941 totaled 20,458,937 tons or 102.5 per cent of capacity. Fourth quarter shipments were 5,321,501.

U. S. Steel had an average of 304,394 employees in 1941 to whom it paid $601,117,053 in salaries and wages. The directors, meeting Tuesday at New York, voted the quarterly common dividend of $1, payable Feb. 20 to shares of record March 20, and the quarterly $1.75 preferred dividend, payable Feb. 20 to stock of record Jan. 30.

Aluminum Uses Defined

Washington

• • • **Use of aluminum** for deoxidizing and alloying in steel making and for match plates, patterns and snap flasks was permitted under WPB's conservation order M-1-E, issued Tuesday, Jan. 27, which provides for the use of aluminum after Jan. 27, except on war contracts. Aluminum allocation between Oct. 31, 1941, and Jan. 26, 1942, is not subject to the order. Only 15 uses of aluminum are permitted, most of them restricted to low grade aluminum which has not been debased. The steel industry may use not exceeding in any one month .03 of 1 per cent by weight of the amount of carbon steel and 1 per cent by weight of the amount of alloy steel produced during such month.

LIGHTER GAUGE STAMPINGS, too

The versatility of our men and machines is limited only by the needs of those who entrust to us the important task of producing their stampings.

In the instance illustrated, a Tank Rim for an electrical transformer—16¾" long, 18⅛" wide and 5¼" deep—was stamped out of steel .075" thick. Yet each angle, arc, port and flange is clean and clear —and true to gauge.

Present your problems to Parish. The services of our engineers frequently result in economies of important proportions . . . yet their contributions are not evident in our costs.

Let us review your requirements.

PARISH PRESSED STEEL CO.

READING, PA.

PACIFIC COAST REPRESENTATIVE, F. Somers Peterson Co., 57 California St., San Francisco, Cal.

Canada's Steel Needs from U. S. Set at 2 Million Tons

Toronto

• • • **F. B. Kilbourn,** Canadian steel controller, stated that under the expanding war program the Dominion's steel requirements in 1943 will reach a record of more than 5,000,000 tons. He also stated that for the current year it will be necessary to draw upon the United States for more than 2,000,000 tons of steel.

With existing production facilities Canada's output of steel ingots this year should reach a total of upwards of 2,500,000 tons, while with the additional capacity which will result from substantial enlargements to Algoma Steel Corp., at Sault Ste. Marie, Ont., and the Dominion Steel & Coal Corp., Ltd., Sydney, N. S., production next year will be increased by about 600,000 tons. Against this steel making capacity, Canada's rated capacity for pig iron production now is 1,706,500 tons per annum, and with completion of the proposed two new blast furnaces and the rehabilitation of an old stack, this capacity will be increased to approximately 2,450,000 tons by the middle of 1943. Thus, by the middle of next year Canada's steel ingot capacity will be about 600,000 tons above the pig iron rate. However, requirements of merchant melters for foundry and malleable iron runs slightly better than 300,000 tons annually, which would detract from the gross output of blast furnaces for steel making. Around 1,000,000 tons of steel scrap will be required to meet mill requirements.

Mount Heads Steel Founders

• • • **O. E. Mount** of American Steel Foundries, Chicago, was elected president of the Steel Founders' Society of America at a recent meeting of the board of directors of the society in New York, according to R. L. Collier, secretary.

Other officers elected at the meeting include: vice-president, L. C. Wilson, Reading Steel Casting Division of American Chain & Cable Co., Reading, Pa., and executive vice-president, Col. Merrill G. Baker. R. L. Collier was re-elected secretary-treasurer.

Brass Shoe Eyelets Hit by New Order

Washington

• • • **WPB has issued** Supplement No. 1 to copper conservation order M-9-C and claims it will save enough brass to make 1,000,000 artillery shell cases a year. The order provides for the use of substitutes for brass in shoe eyelets. Manufacturers, said WPB's division of industry operations, have agreed that they can use Japanned metal instead of brass with no loss in wear.

The order, effective immediately, provides that between Jan. 1 and March 31 no shoe manufacturers may make a greater number of eyelets than will be necessary to fill orders for deliveries before April 1. Use of copper during the period is also limited.

ECONOMIZE ON ZINC

with

MEAKER PROCESS

for Electro-Galvanizing Wire

Even the lightest coatings are uniformly distributed on the wire surface. Control of coating thickness is exact. You can save on zinc, produce more perfect coatings, make more profit with Meaker Process for Electro-Galvanizing Wire.

"A proven success by every test"

WE INVITE YOUR INQUIRY

The MEAKER Company

1635 South 55th Avenue, Chicago

Pool Plan for War Output Discarded at Chicago

Chicago

• • • **The "Chicago Pool"** plan, which was to have embraced 3000 local firms in war sub-contracting, has been discarded. Devised by Alex Taub of OPM's labor division, the plan would have built up 100 pools in this area and was to have set the stage for similar operations in principal industrial areas throughout the country. Officially, the reasons given for abandoning the plan were that (a) it was too big; (b) that its leaders did not have the proper authority; (c) that many of the small firms were aloof to the idea. Unofficially, it has been rumored that the plan was opposed in high places for reasons of encroachment upon the jurisdiction of different agencies.

Kilby Steel Co. Starts Work on New Open Hearth

Anniston, Ala.

• • • **Kilby Steel Co.,** which is engaged in the production of shells and ammunition components, has started work on the construction of a 35-ton open hearth furnace at its plant here.

The open hearth, expected by the company to be completed about April 1, will give Kilby a steel ingot capacity of approximately 45,000 tons annually. About 15,000 tons is being supplied by the company's two electric furnaces.

Almost every type of product requires Parts Like These

Hubbard makes them out of steel, brass, bronze and other metals—in all kinds of sizes, shapes and forms—treated and processed to meet user's specifications. Your request for information about Parts Like These for your products will be studied carefully and recommendations returned to you.

M-D-HUBBARD SPRING CO.

331 CENTRAL AVE. • PONTIAC, MICH.

Coming Events

Jan. 26 to 29—American Society of Heating and Ventilating Engineers, Philadelphia.

Jan. 26 to 30—American Institute of Electrical Engineers, annual winter convention, Engineering Societies Bldg., New York.

Feb. 9 to 12—American Institute of Mining & Metallurgical Engineers, Waldorf-Astoria Hotel, New York.

Feb. 12 to 14—18th Annual Iron and Steel Conference, Del Monte, Calif.

March 4—American Society for Testing Materials, Cleveland.

Apr. 14 to 17—Packaging Exposition and Conference, Hotel Astor, New York.

Apr. 15 to 17—Open Hearth Conference, Cincinnati.

April 15 to 18—The Electrochemical Society, spring convention, Nashville, Tenn.

Apr. 18 to 24—Foundry and Allied Industries Show, Cleveland.

Apr. 20 to 24—American Foundrymen's Association, Cleveland.

Apr. 27 to May 1—American Mining Congress, Coal Show, Cincinnati.

May 25 to 28—National Association of Purchasing Agents Convention, Waldorf-Astoria Hotel, New York.

June 21 to 25—American Water Works Association, Chicago.

Aug. 23 to 30—National Association of Power Engineers, New Orleans.

Sept. 1 to 11—Building and Construction Trades Council, Atlantic City, N. J.

Sept. 22 to 24—Association of Iron and Steel Engineers, Pittsburgh.

Oct. 5 to 9—National Safety Congress Association, International convention, Baltimore.

Oct. 12 to 16—National Metal Congress and Exposition, Detroit.

Nov. 30 to Dec. 5—National Exposition of Power & Mechanical Engineering, Grand Central Palace, New York.

Bikes Replace Autos For Power Concern

• • • Bicycles are being substituted for automobiles where practicable by Marion-Reserve Power Co., Marion, Ohio, in an effort to conserve automobiles and tires. The power company recently purchased 12 bikes and plans to buy more. They will be used by meter readers and for some types of service calls. The company's branch offices have been instructed to adopt the same policy.

A. S. M. Offers Assistance To Small Manufacturers

Detroit

• • • Through the local office of the Division of Contract Distribution, Production Division, War Production Board, it has been announced that the American Society for Metals has made available free metallurgical advisory service to small defense manufacturers. The service will be confined to problems not requiring library or laboratory research. Inquiries should be addressed to W. F. Wilson, at the division office in the Boulevard Bldg., Detroit.

Idle Plant at Gary May Be Restored to Production

Gary, Ind.

• • • It is understood the Defense Plant Corp. has under consideration a plan for reopening the National Tube Co. plant here which has been idle for some years. According to reports, the plan calls for National Tube to make tubing for war purposes, while Carnegie-Illinois Steel Corp. would erect and operate a plate mill in the plant. In the past year, Gary civic interests have been active in urging the United States Steel Corp. to reopen the plant.

Rustless Reports 1941 Profit of $2,332,297

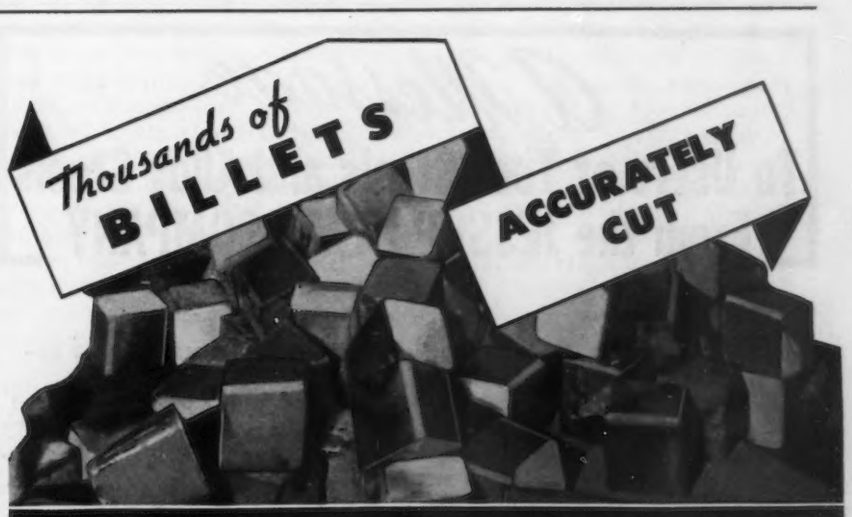
Baltimore, Md.

• • • Rustless Iron and Steel Corp. reports a net profit for 1941 of $2,332,297, subject to audit, and a fourth quarter profit of $622,097. Provision for Federal income and excess-profits, and state income taxes totaled $1,668,100.

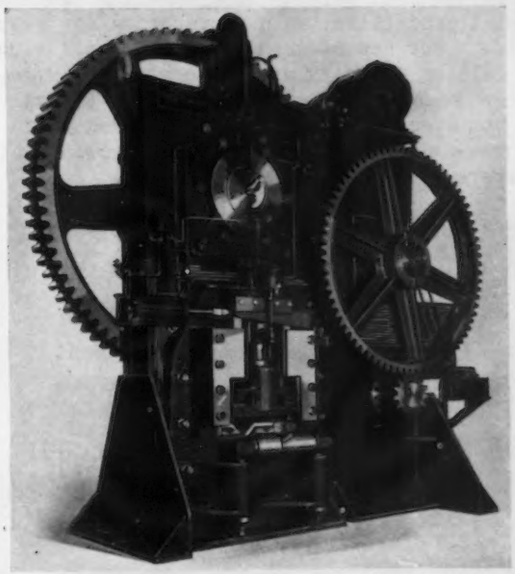
Canada Puts Strict Control On All Building Steel

Toronto

• • • F. B. Kilbourn, Canadian Steel Controller, has issued a new order which provides strict control of all building steel. The order, now in effect, decrees that without permission of the controller, no person shall supply or purchase or use new or second hand, plain or fabricated steel plates, structural shapes or bars for the construction, remodeling or repair of any building, container tank, boiler, bridge, tower, conveyor or other stationary structure. The order also makes it necessary for steel distributors to give monthly reports of their stocks of the products affected and their contracts involving the use of one ton or more.



. . . IN RECORD TIME



● No place for "weak sister" tools in today's production rush. The toughest jobs — cutting husky chunks of billets for shell and crankshaft forging stock—must keep up the pace constantly day and night. Buffalo Billet Shears are contributing just that kind of dependable service. These rugged machines are built of "Armor-Plate" steel, with electrically welded frames. Modern designing provides easy control, accurate and uniform cutting *at low cost per unit.* Eleven standard sizes for cutting rounds up to 10″; squares up to 9″.

BUFFALO FORGE COMPANY, 492 Broadway, Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" **BILLET SHEARS**

Reed and Matthiessen Placed in New WPB Posts

Washington

• • • **Philip D. Reed,** chairman of the board of directors of General Electric Co., has been made head of WPB's industrial branches in the Division of Industry Operations and C. H. Matthiessen, Jr., has been appointed to take charge of the division's priorities program. Announcement of these appointments was made by Division Director J. S. Knowlson.

In February, 1941, Mr. Reed became senior consultant in the OPM Priorities Division, and in July became deputy director of the Industrial Subdivision of the Priorities Division. Later he was appointed deputy director of the Materials Division, and on Jan. 1, 1942, he was made special assistant to the directors general in charge of industrial branches. His new position will involve similar duties.

Mr. Matthiessen came to Washington in February, 1941, as executive assistant in the OPM General

A Message

To Users of Tool Steels and Alloy Steels From the JESSOP STEEL COMPANY

Gentlemen:

Now that America is fully engaged in the struggle against the aggressor nations, an ever-increasing quantity of tool and die steels will be required for armament production. To this end, the Jessop Steel Company has greatly increased its production capacity during the past two years and is utilizing this capacity to the fullest extent by employing three shifts of workers on a seven-day week.

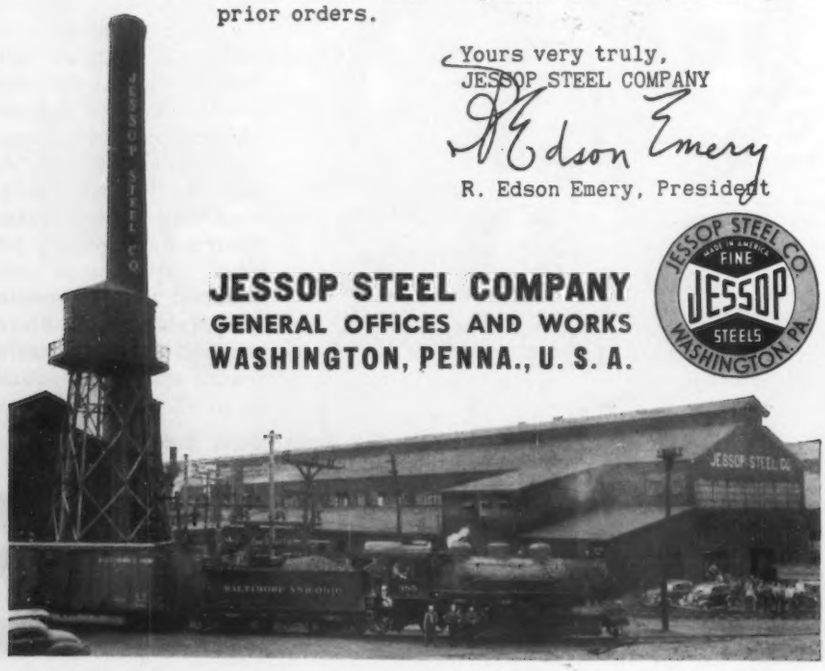
We have also increasd our production of stainless-clad steel for use in the vital chemical and food industries, and of our special steels which enter into the manufacture of many types of armaments.

Not content with our present production, we are preparing for even greater tonnage during 1942. Our new 84-inch plate mill will soon be rolling steel and our melting capacity will also be greatly increased in the near future. Meanwhile, we will make every effort to ship you steel when you need it. We ask your forebearance when shipments are delayed owing to prior orders.

Yours very truly,
JESSOP STEEL COMPANY
R. Edson Emery
R. Edson Emery, President

JESSOP STEEL COMPANY
GENERAL OFFICES AND WORKS
WASHINGTON, PENNA., U. S. A.

JESSOP STEEL CO. MADE IN AMERICA FINE JESSOP STEELS WASHINGTON, PA.



Luria Named Distributor Of Forged Carbides

• • • **Luria Steel & Trading Corp.,** 233 Broadway, New York, has recently been appointed exclusive distributors for Forged Carbides, Inc. The product of this company is a new type of cutting metal in which each tungsten carbide tip is forged after sintering. This special forging process increases the density by approximately 20 per cent, producing a tougher material with superior wearing qualities which insure longer tool life and fewer interruptions to production.

The forging operation has also produced characteristics that make one basic grade suitable for cutting both cast iron and steel as well as non-ferrous metals. In addition to this general grade, two special grades are available for certain steel cutting applications involving high speed continuous production. Although the forging of tungsten carbides is a comparatively recent development, the material has been operating successfully on defense production for many months. This new material is treated and handled in identically the same manner as ordinary cemented carbides.

Tips are supplied in 13 standard sizes, ranging from 3/16x3/8x1/2 in. up to 1/2x1/2x1 in. Finished tools are also available, either milled and brazed or finish ground and diamond honed ready for use.

Aetna Standard's Backlog Jumps to $13,000,000

Youngstown

• • • **Unfilled orders of** Aetna Standard Engineering Co. have jumped to $13,000,000, according to President Ernest E. Swartswelter in a letter to stockholders. This compares with unfilled orders of only $5,902,461 on Dec. 31, 1941, indicating the size of recent war orders placed with the company.

PERSONALS . . .

• **E. L. McGraw,** formerly director of purchases, has been named head of the new scrap and salvage department of the Allegheny Ludlum Steel Corp., Pittsburgh, to be located at the company's Brackenridge plant. The responsibilities of the department will be shared by **E. A. Grine,** who was appointed assistant manager.

Coincidental announcement was also made of the appointment of **L. H. Bittner** to the position of director of purchases. Mr. Bittner, who went to the Brackenridge purchasing office several years ago, formerly held the purchasing portfolio at Allegheny Ludlum's Dunkirk, N. Y., plant and brings a thorough background of experience to his enlarged duties. He will be assisted by **N. W. Hayson,** who was appointed purchasing agent. Both men will make their headquarters at Brackenridge.

• **Charles J. Hunter** has been named metallurgical engineer (ordnance materials). Mr. Hunter will coordinate production of ordnance materials for Carnegie-Illinois, with headquarters at the Homestead, Pa., Steel Works. Mr. Hunter began his industrial career as a metallurgical observer at the Homestead Works in 1935, and a year later became a metallurgist assistant. In 1938, he was named chief observer, More recently he has been metallurgist successively in charge of heat treated products, the Charleston division and ordnance materials.

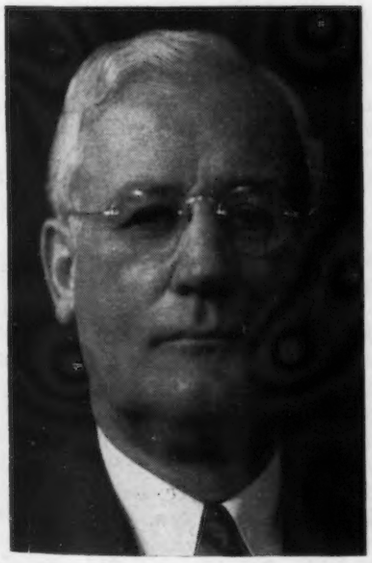
• **Clyde Llewelyn** has been appointed assistant to the president of Bliss & Laughlin, Inc., Harvey, Ill., with headquarters at Harvey. Mr. Llewelyn entered the employ of Bliss & Laughlin, Inc., in October, 1928, as a metallurgical engineer at the Harvey plant. In 1929, he was transferred to Buffalo and made chief of the metallurgical department of the new plant which had just been completed. Later he was appointed general superintendent of the Buffalo plant. During the past 20 months, he has been in charge of the company's problems pertaining to the handling of priorities, allocations, clarification of government specifications, etc.

• **Robert A. Lambeth,** treasurer, has been named vice-president and treasurer of North American Aviation, Inc., Inglewood, Cal. **Raymond H. Rice,** chief engineer, has been appointed vice-president in charge of engineering, and **J. S. Smithson,** general manufacturing manager, vice-president in charge of manufacturing.

Mr. Lambeth first became affiliated with the aviation industry in 1931 when he accepted the position of comptroller with Western Air Express at Burbank, and shortly thereafter became treasurer of General Air Lines, a subsidiary. He later became treasurer. In 1936, he became assistant treasurer of Transcontinental & Western Air, Inc., leaving later in the year for Baltimore, to take the position of comptroller for North American Aviation. He became treasurer of the company in 1938.

Mr. Rice first became associated with the industry as a junior engineer in the Army Aircraft Branch at Wright Field. After one year with this organization, he became affiliated with the Glenn L. Martin Co., where he was in charge of structural design and worked on the first China Clipper and early Martin B-10 bombers. In 1935, he went to Dundalk, Md., where he joined the staff of North American, and was placed in charge of structural design. Since that date he had held the positions of chief of design and assistant chief engineer, becoming chief engineer of the company in 1939.

Mr. Smithson, who first turned to aviation in 1926, brings to his new position a well-rounded experience in the industry, starting as a tracer in the drafting department of the Douglas Aircraft



E. L. McGRAW, manager of the newly-formed scrap and salvage department of Allegheny Ludlum Steel Corp., Pittsburgh.

L. H. BITTNER and N. W. HAYSON, director of purchases and purchasing agent, respectively, of Allegheny Ludlum.

Company. Although soon advanced to detail work and then to layout, he left in 1927 for a position in an architect's firm. The new vice-president returned to Douglas in 1928 and in 1929 became project engineer. He joined the staff of North American in 1934 as chief draftsman, and in 1937 he was advanced to the position of production manager. He was appointed general manufacturing manager in 1939.

• **George W. Codrington,** general manager of the Cleveland Diesel Engine division of General Motors Corp.; **Nicholas Dreystadt,** general manager of Cadillac; **H. L. Hamilton,** head of Electro-Motive division; **H. J. Klingler,** general manager of Pontiac, and **S. E. Skinner,** general manager of Oldsmobile, have been elected vice-presidents of General Motors Corp. At the same time **Frederick G. Donner,** vice-president in charge of finance, was elected a member of the board of directors. **Harry W. Anderson,** recently placed in charge of the personnel staff, was elected vice-president and a member of the administration committee. Mr. Anderson took charge of the personnel staff when **B. D. Kinkle,** vice-president, became head of the manufacturing staff. The GM board also announced formally the resignation of **James D. Mooney** as a member of the board of directors, a member of the administration committee and as a vice-president of the corporation. Mr. Mooney now is in active service with the United States Navy.

• **R. M. Wagner** has been named production manager for all plants and all products of Buick Motor division of General Motors Corp. **C. N. Ofield,** for the past nine months chief inspector of aircraft engine production, becomes chief inspector for all plants and products. The functions of **Fred Pyper,** master mechanic, have been similarly extended to cover all plants and all products. **Ivan L. Wiles,** divisional comptroller, is given responsibility for all accounting activities of all Buick plants.

• **Joseph B. Graham,** one of the founders of the Graham-Paige Motors Corp., has announced his resignation as president of the corporation. His successor is **R. J. Hodgson,** who was manager of the local office of the Reconstruction Finance Corp. until Dec. 31, 1941. Mr. Graham continues as a director and retains his financial interest in the company which is now engaged exclusively in war work.

• **Fred G. Phillips** completes thirty-six years of service with the Hewitt Rubber Corp., Buffalo, with his retirement from active duty as Boston branch manager. Mr. Phillips is well known in the Boston area, having served as branch manager for the past 24 years. He is succeeded in this capacity by **Andrew Thompson,** formerly Hewitt's Northern New England representative. Mr. Thompson, a graduate of Princeton, spent several years in the home office of the Hewitt company before his appointment to the New England territory.

• **I. M. Laddon** has been named executive vice-president and general manager of Consolidated Aircraft Corp., second in command to the firm's new president **Harry Woodhead.** Mr. Laddon has been associated with the aircraft industry since 1917. Until his advancement he had served as vice-president and works manager.

• **W. L. White,** director of laboratories, and **H. Snyder,** manager of the roll covering and tank lining departments, now have been made assistant factory managers of the Manhattan Rubber Mfg. division of Raybestos-Manhattan, Inc., Passaic, N. J. **H. H. Burrows** has been appointed manager of the roll covering and tank lining departments and **P. A. Cady** will be laboratory manager.

• **J. H. Allen** has resigned as vice-president of the Hokar Products Corp., New York, to take over the management of the Olavarria Trading Corp., New York, newly formed organization for general iron and steel export business, including machinery. Mr. Allen has been associated with the iron and steel industry for many years and was New York district sales agent of the Elyria Iron & Steel Co., prior to its merger with Republic Steel Corp.

• **John R. Hoover** has been appointed manager of synthetic sales of the B. F. Goodrich Co., Akron, Ohio. Mr. Hoover succeeds **Dr. H. E. Fritz,** who was recently named company director of research. He had been manager of rubber-lined equipment sales since 1935 and is succeeded in that post by **Herman C. Klein,** who had been sales engineer in the department. Joining B. F. Goodrich in 1925, Mr. Hoover started in the general chemical laboratories, later was in the technical and production departments of the boot and shoe division and manager of the general chemical laboratory until he was named sales engineer in the rubber-lined equipment department in 1931, becoming department manager four years later. Mr. Klein, born in Vincennes, Ind., was graduated from high school there and received his bachelor of science degree in chemical engineering from Purdue University in June, 1929, joining B. F. Goodrich the following August. He remained in the company's laboratories one year, and then became sales engineer in the department he now heads.

• **Walter S. Tower,** president of the American Iron and Steel Institute, has been nominated an honorary member of the Iron and Steel Institute, London. **Dr. Andrew McCance,** director of Colvilles, Ltd., has been elected a vice-president of the institute. Professor J. H. Andrew, D.Sc., of Sheffield University, and N. H. Rollason, managing director of John Summers & Sons, Ltd., have been elected members of council. The new officers are James Henderson, deputy chairman of the Appleby-Frodingham Steel Co., Ltd., and director of the United Steel Companies, Ltd., president and R. G. Lyttelton, director of Guest, Keen & Nettlefolds, Ltd., and of Guest, Keen & Baldwins Iron & Steel Co., Ltd., honorary treasurer.

• **George Eglinton** has resigned as sales manager of the Wickman Corp., Detroit, and will return to his former position as vice-president and general manager of the Lincoln Park Tool & Gage Co. Mr. Eglinton's decision came as a result of the greatly increased demands put upon the Lincoln Park organization by the new war program. The new Wickman sales manager is T. B. (Bert) Carpenter who has been a prominent figure in the machine tool industry for many years. For the past seven years, he has been associated with the National Automatic Tool Co., Richmond, Indiana. During this period he was a sales engineer in Natco's Detroit and Chicago offices as well as spending some time in Paris, France, as the company's European representative.

• **J. C. Dallam,** manager of the wiring device section of the appliance and merchandise department of the General Electric Co., Schenectady, has retired after 40 years of service. He is succeeded by **T. D. Foster** who, in addition to his new duties as manager of the wiring device section, will retain his present position as manager of the accessory equipment section. Mr. Foster joined the G-E wiring device section in 1924 and was made manager of the accessory equipment section upon its formation in 1928. He had been superintendent of the American Chicle Company's refining plant in Long Island City, N. Y., from 1919 to 1924.

Mr. Dallam's association with General Electric began in 1899, when after being graduated from Yale's Sheffield School, he was employed in the G-E hourly rate drafting department at Schenectady. In 1935, Mr. Dallam began his 36-year association with wiring devices. He was transferred to Bridgeport when the manufacture of wiring devices and the sales department were moved there in 1921.

• **James H. Withers** has been appointed Los Angeles representative of Manning, Maxwell & Moore, Inc., Bridgeport, Conn.

• **B. F. Stauffer** has been named assistant general manager of the new Industrial Products Sales division, headed by **W. S. Richardson** of B. F. Goodrich Co., Akron, Ohio, in charge of Miller plant activities; **L. H. Chenoweth** has been appointed manager, manufacturers' sales; **C. F. Conner,** manager, distributer sales, and **C. O. Delong,** manager, operations. The following department managers have also been named: **P. W. Van Orden,** hose and belting; **J. F. Johnston,** molded, extruded, sponge, Anode dipped goods; **G. K. Ryan,** rubber and latex thread, and **H. C. Klein,** rubber lined and covered equipment.

• **I. M. Laddon** has been named executive vice-president and general manager of Consolidated Aircraft Corp., San Diego, Cal. Mr. Laddon, one of the nation's foremost aircraft designers, has been associated with the industry since 1917. The first all-metal plane constructed in this country was of his design. He joined the Consolidated organization in 1927. Recently he has been vice-president of the company and works manager. He was first employed by the Cadillac Motor Car Co. and in 1917 entered the engineering division of the Air Service at Washington, later moving to McCook Field. In 1918 he was appointed Chief of Design Branch 2 which was charged with bombardment airplane development.

• **William E. Simons,** former Milwaukee branch manager for the Ford Motor Co., has been appointed executive secretary of the Wisconsin salvage committee which will organize a program to encourage the saving of old rubber, metals, paper, rags and other essential material for defense industry.

• **F. H. Cash** has been put in charge of both the Minnesota and Michigan ore mines of the Republic Steel Corp. in accordance with a reorganization placing all Northern ore mines in one operating district. Mr. Cash, whose headquarters will be in Hibbing, Minn., has been with Republic and its predecessors for almost 33 years and formerly was in charge of the Minnesota Iron Ore Mines of the company.

• **John D. Berg,** board chairman, Dravo Corp., has resigned as chief of the Pittsburgh Ordnance Office to devote full time to his duties with his company. He was appointed last September and until a new appointment is made, **Col. James L. Guion,** deputy chief, will be in charge of the Pittsburgh office.

• **Martin Eliason,** of the Chicago branch of the Jessop Steel Co., Washington, Pa., has been appointed representative in the Milwaukee territory with offices located at 419 Colby Abbott Building, Milwaukee. Prior to joining the Jessop Steel Company, Mr. Eliason was sales representative for four years and general superintendent for seven years at the Chicago division of the York Safe and Lock Company.

• **Henry A. Saller** has been named a research engineer on the technical staff of Battelle Memorial Institute, Columbus, Ohio, and has been assigned to research in metallurgy. A graduate in metallurgy of Purdue University, Mr. Saller was associated with the Carnegie-Illinois Steel Corp. prior to joining the Battelle staff.

OBITUARY . . .

• **Jesse F. Hirschman,** architect in charge of construction of many important Detroit buildings including General Motors Building and the First National Bank Building, was buried Jan. 20 in Detroit. Mr. Hirschman, born in Republic, Mich., in 1880, was a graduate of the University of Michigan and had been associated with Albert Kahn, noted industrial architect.

• **Henry C. Genthe,** superintendent of construction for the Michigan Alkali Co., Wyandotte, Mich., died Jan. 17. He was 74 years old. Born in Wyandotte, Mr. Genthe was employed by Michigan Alkali Co. for 45 years.

• **Edward Sieby,** pioneer in the automobile industry, who helped build the first Reo automobile, died in Lansing on Jan. 20, aged 87 years. Mr. Sieby went to Lansing, Mich., as a millwright and joined the Reo company in 1904. He was chief pattern maker when he retired in 1929.

• **Frederic B. Jacobs,** former editor of *Abrasives* and well-known authority on abrasives and grinding, died Jan. 20 at his home in Cleveland, at the age of 62. Mr. Jacobs learned the machinist's trade at an early age, following which he became a skilled machinist and tool maker, being employed in over 40 shops before entering the employ of the Carborundum Co., Niagara Falls, N. Y., in 1908. He was later affiliated with the Abrasive Co., Philadelphia, and the Nordyke & Marmon Co., Indianapolis, where he was assistant to the chief tool designer and supervised part of the work of designing tools for manufacture of Liberty airplane motors for service in World War I. Leaving Nordyke & Marmon in December, 1918, Mr. Jacobs entered the employ of the Penton Publishing Co., Cleveland, and was on the staffs of *Iron Trade Review* (now *Steel*) and *Marine Review.* He was appointed editor of *Abrasive Industry* in 1920, and later of *Abrasives.*

• **Horace E. Newell,** representing the L. S. Starrett Co. in the South, died at Atlanta, Ga., Jan. 19. He was 47 years old.

• **William F. Quinn,** manager of the Baush Machine Tool Co., Springfield, Mass., died Jan. 17.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Much Paper Work Involved In Price Regulations

Cleveland

• • • **The machine tool industry** took the OPA's new price regulations, with the attendant amount of paper work involved, in a rather calm and cooperative spirit, since the general opinion is that the price ceiling as a whole is fair to the industry. However, some industry observers were of the opinion that the OPA is letting itself in for a lot of paper work in asking for a record of all orders handled by machine tool manufacturers and dealers. When it is considered that a single machine tool manufacturers can handle as many as 600 orders in a single month, an idea may be gathered of the large amount of paper records that the OPA will soon gather regarding the industry and of the large staff that will probably be required to attempt to check this material carefully! Some observers believe that the OPA do just as good a job of checking by making spot checks of concerns who are reported to be violating prices.

It is reported that a number of concerns in the industry have received pool orders for their entire 1942 output, other than the firm orders already existing on their books. These pool orders are being given to provide an incentive for expansion and also to lay the basis for financing larger inventories by such manufacturers. It is understood that tool manufacturers may borrow up to 50 per cent of the value of the pool orders they have received.

Among the new buyers that have come into the market within the past week or so may now be included the Cleveland Tractor Co., which is in the market for production and tool room milling machines, grinders and radials and lathes. The Iron Fireman Co. is reported to be preparing to ship some of its currently purchased equipment to its Oregon plant.

An interesting sidelight in machine tool affairs in recent weeks has been the difficulty of some producers in obtaining small amounts of steel plate 2 in. thick or over required for high priority machines. Although such orders are rather undesirable for the mills and are troublesome to handle, Army and Navy officials are seeing to it that delivery is made to go into high priority machinery orders.

Increased Output Laid To Use of Green Men

Cleveland

• • • **In its latest issue** of "Machine Tools," the National Machine Tool Builders Association, Cleveland, attributes the sharp increase in 1941 machine tool output to $750,000,000 as against $450,000,000 in 1940 to the following: (1) Installation of new equipment; (2) expansion of plants; (3) second and third shift operations; (4) extensive sub-contracting and (5) training new men. The association report goes on to state that most of the men making machine tools today had never seen the inside of a machine tool plant two years ago.

24-Hr. Schedules Planned

Cincinnati

• • • **With new business flowing** in ever steady stream and prices now fixed by Washington decree, district machine tool builders are focusing attention on the question of production. Conference of representatives from 150 war industries in this area last week evolved approval of a 24-hour-a-day schedule. With each man working 56 hours a week and the men organized in units of three, rotation of off days is worked out so that no man works more than six days a week. Under the plan, the other two men of the unit work overtime when one is off. While no official adoption of the plan has been made in any of the local machine tool factories, their representatives at the conference joined in approval. That some plan of this type is likely to be adopted is a foregone conclusion since need for greater output is daily apparent. Of course, the personnel problem still is present and with the adoption of this or any similar plan, management is faced with the further problem of manning the 24 hours of the day.

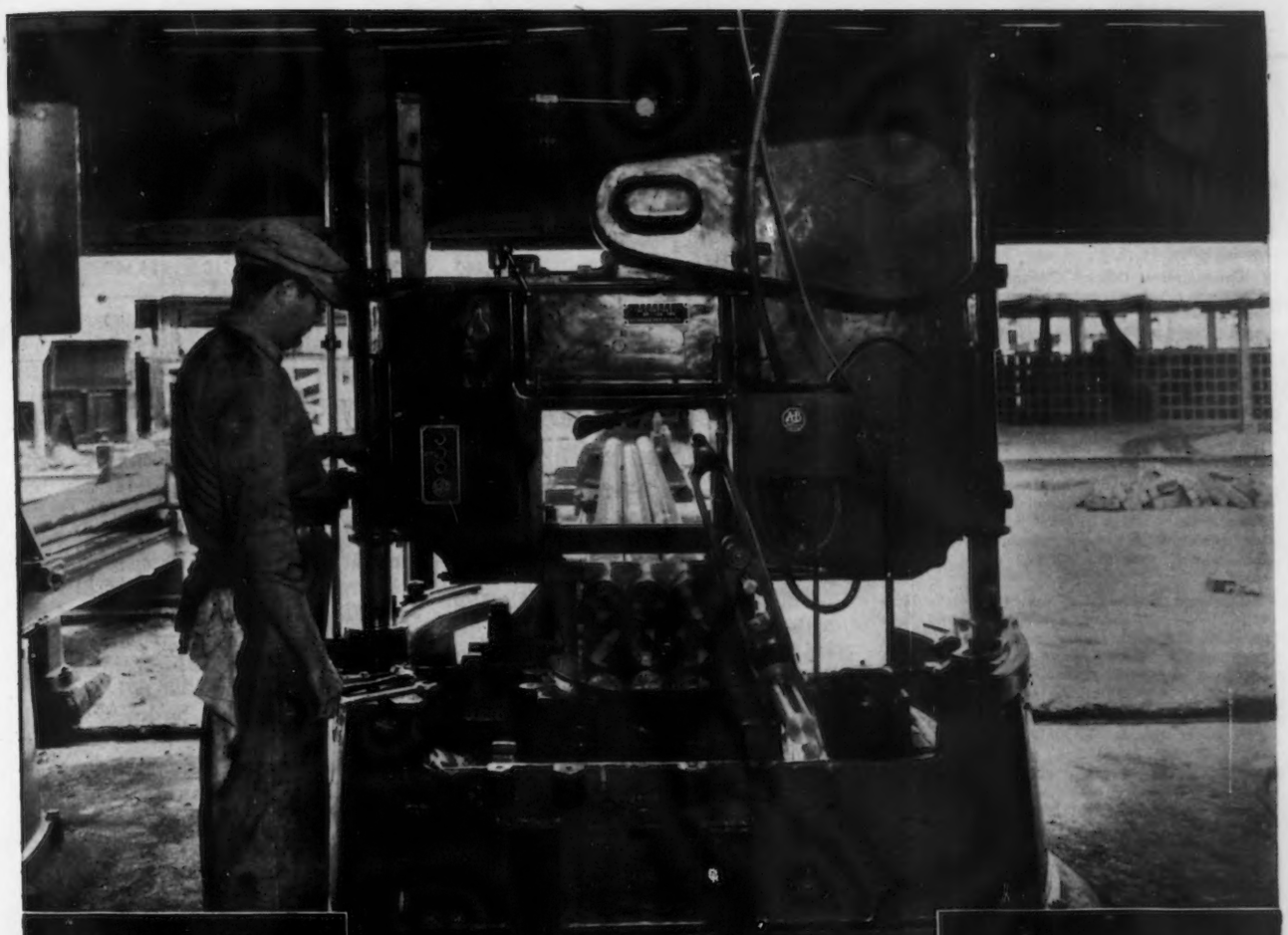
Doubled Output Problematical

Chicago

• • • **If the machine tool industry** were to increase its 1942 output to between one and one-half to two billion dollars, the expanding companies' new equipment needs would be equal to a very large chunk of the industry's total production of $750,000,000 in 1941. About 16 manufacturers of key machine tools have been approached with feelers about doubling their individual capacities this year. As one leader privately remarked, this would keep too much of current production in the industry's backyard and such colossal expansion could not be completed in time to swell 1942 shipments. One of the 16 companies would require between 35 to 45 big horizontal boring mills alone, which is equivalent to about four months' total output of these larger sizes by one producer.

As is well known now, many of the key companies have swelled numbers of employees two to three times in the past two years and feel that finding enough men to almost double working forces again is virtually an impossible job. Not only are equipment and men tough hurdles, but finding new space for plant additions would be difficult for some and would entail decentralizing operations by companies that have always been integrated physically.

Just how serious Washington is about more than doubling machine tool production this year is a guess. The industry is preparing and anxious to step up output by a considerable margin in this year of war; but the possibility of hitting one and one-half to two billion dollars seems obscure.



MARVEL SAWS

Cut anything that will go between the jaws

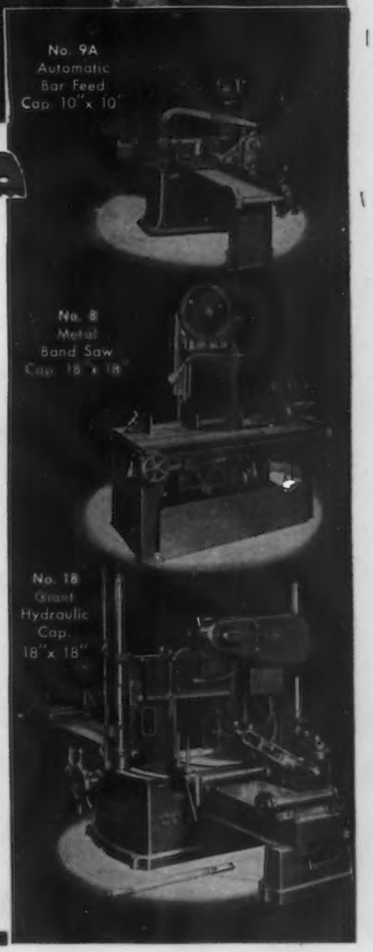
This is one of five No. 18 MARVEL Giant Hydraulic Hack Saws used by a well known Texas tool company to cut-off "multiple bars of alloy steel in round, square, and flat shapes, up to the maximum capacity of the large work-throat (18" x 18")".

These super hack saws are designed for the largest sizes, and toughest steels—up to 18" x 18". After a year's heavy duty service, when asked as to the effectiveness of these saws in solving the cutting-off problems at this plant, the mechanical engineer in charge reported them "very effective."

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave. Chicago, U. S. A.
Eastern Sales Office: 225 Lafayette St., New York



Pipe Lines

● **Barnsdall Oil Co.**, Barnsdall, Okla., plans new welded steel pipe line from recently developed Midway oil field area, Lafayette County, Ark., to point on Ouachita River, close to 50 miles, for crude oil transmission. Terminal facilities will be located at last noted point.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Feb. 3 for 5000 ft. of ½-in. steel pipe; also for 500 c.i. tees (Circular 1570).

Panhandle Eastern Pipe Line Co., 1223 Baltimore Street, Kansas City, Mo., has work under way on new welded steel pipe line from Milwaukee, Mich., to Flint, Mich., about 42 miles, for natural gas transmission for distribution in latter city; connection will be made with pipe line from Michigan gas field area, providing about 70 per cent Texas gas and 30 per cent Michigan natural gas for Flint district. This is part of pipe line system of company to be constructed in southern Michigan territory, previously noted in these columns.

Oklahoma Natural Gas Co., 401 North Harvey Street, Oklahoma City, will build new pipe line gathering system in Chickasha, Okla., gas field area, with booster station for service in connection with transmission of new gas supply to main pipe line system. Cost over $135,000.

Board of District Commissioners, Washington, asks bids until Feb. 5 for 36-in. main trunk line for water system from Thirteenth and Upshur Streets, N. W., to Thirteenth and Otis Streets, N.E., with alternate bids on steel, cast iron or concrete.

Sinclair-Prairie Oil Co., Gulf Building, Houston, Tex., has approved plans for new 4-in. pressure pipe line from recently located oil field district near Perrin (Jack County), Tex., to connection with main 8-in. pipe line in that section, for crude oil transmission. Work is being placed under way.

Edinburg, Tex., has voted against proposition to issue bonds for $175,000 for pressure pipe line system for natural gas distribution, at special election, Jan. 15, and project will be held in abeyance.

Windsor Gas Co., Ltd., Windsor, Ont., plans extensions in steel pipe line system to St. Clair Beach district, for natural gas transmission for distribution in that area. Cost over $50,000.

Cast Iron Pipe

● **City Council,** Pelley, Tex., closes bids Feb. 7 for pipe lines for water system and other waterworks installation; also for extensions in sewage system. Cost close to $126,000. Garrett Engineering Co., 3504 Audubon Street, Houston, Tex., is consulting engineer.

United States Engineer Office, Wright Building, Tulsa, Okla., asks bids (no closing date stated) for pipe lines for water distribution at new Cookson Hills Cantonment project, Braggs, Okla., including water line from Greenleaf Lake to new 3,000,000-gal. concrete reservoir adjacent to cantonment, for which bids are being received at same time. Also for pipe lines for gas distribution system.

Village Council, North Fairfield, Ohio, plans pipe lines for water system and other waterworks installation, including elevated steel tank and tower. Cost about $63,000. Financing has been arranged through federal aid. Champe, Finkbeiner & Associates, Nicholas Building, Toledo, Ohio, are consulting engineers.

City Council, Galena Park, Tex., closes bids Feb. 7 for pipe line extensions in water system and other waterworks equipment, including pumping station and two 250-gal. per min. pumping units and accessories, valves, hydrants, fittings, etc. Cost about $69,000.

Weekly Bookings of Construction Steel in Tons

Week Ended →	Jan. 27, 1942	Jan. 20, 1942	Dec. 29, 1941	Jan. 28, 1941	Year to Date 1942	Year to Date 1941
Fabricated structural steel awards	28,850	29,000	7,400	43,850	122,050	173,600
Fabricated plate awards	890	2,500	625	930	3,390	14,915
Sheet steel piling awards	100	0	0	665	100	3,955
Reinforcing bar awards	41,400	28,200	20,400	10,710	186,600	39,670
Total letting of Construction Steel	71,240	59,700	28,425	56,145	312,140	231,140

Railroads Set Steel Requirements During '42 at 6,544,715 Tons

Washington

● ● ● **The railroad industry** has informed defense agencies that in order to carry the heavy defense load thrust upon it, it will need 6,544,715 net tons of steel in 1942. This estimate reflects a reduction of one-third that was made possible by effecting economies. These economies were brought about by decreasing the number of freight cars to be built by reducing the number of bad order cars to the lowest point in modern railroad history and by other means.

The requirements cover material for freight cars, locomotives, maintenance of way and repair work. The largest single estimate calls for 1,632,394 tons of rails. Other rolled steel needs aggregate 2,122,530 tons of which 1,154,309 tons is for delivery to the railroad shops and 968,221 tons is for delivery to independent car and locomotive builders. Requirements for steel castings amount to 677,817 tons, of which 338,179 tons is for delivery to railroad shops and 339,639 tons for independent builders.

The estimates provide for the construction of 91,827 freight cars for delivery up to Oct. 1 and tentatively calls for the delivery of an additional 30,000 cars by both railroad and independent shops during the last quarter. The locomotive program contemplates the construction in both railroad and independent shops of 974 units, including 364 steam, 558 diesel, 33 electric and 19 unspecified engines. Of the 91,827 freight cars, 29,046 requiring 306,891 tons of rolled steel are to be built in railroad shops and 62,781, requiring 536,104 tons of rolled steel are to be built in independent shops. The 30,000 cars proposed for last quarter delivery will take 354,780 tons of rolled steel. Total steel requirements for the locomotives are 230,529 tons and the rolled steel needs are 77,337 tons.

Request for the railroad steel requirements was made by Joseph B. Eastman, Director of Defense Transportation, for the information of the War Production Board, successor to the Supply, Priorities and Allocations Board which had assured full priority, allocation and other necessary assistance for the delivery of materials for the railroads.

It is the railroad view that generally the preference rating of A-3 granted by General Preference Rating Orders P-8, P-20 and P-21 are adequate to obtain most of the essential materials.

RAILROAD STEEL REQUIREMENTS FOR 1942
(Net Tons)

For Delivery To:	Rolled Steel	Steel Castings	Axles and Locomotive Tires	Rolled Steel Sheets	Crankpins and Pistons	All Other Forgings	All Other Miscellaneous Steel Products	*All Other	Totals
Railroad Shops	1,154,309	338,179	145,459	148,483	8,355	30,543	291,244	2,760,585	4,877,157
Car and Locomotive Builders	968,221	339,638	175,431	49,250	856	57,101	77,061	.....	1,667,558
	2,122,530	677,817	320,890	197,733	9,211	87,644	368,305	.....	6,544,715

* Consists of:

Rails	1,632,394
Track fastenings	887,883
Frogs, switches, guards, etc.	103,262
Bridges, buildings, etc.	137,046

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

Metal Tariffs May Be Dropped

• • • **While confirmation** from the State Department has been withheld, reports indicate that an agreement with 16 South American countries, eliminating tariffs for the duration of the war, will be announced shortly. This action is expected to be pointed directly at the importation of strategic metals, such as copper, lead, zinc, bauxite, beryllium, manganese, tungsten, vanadium, and others that are required to keep war production in the United States at peak operations, and will stimulate Latin American production of these vital metals. However, because of the increased demand in this country for such materials, it is unlikely that these imports will affect the status of domestic prices, since MRC is virtually the only importer.

OPA is holding a non-ferrous scrap clinic today, Jan. 29, at the Roosevelt Hotel, in New York, to answer some of the questions most commonly asked about the ceiling price schedules. Dealers and consumers of aluminum, copper, lead, nickel, zinc and brass mill scrap have been invited to attend this meeting.

Estimating a saving of 8000 tons of aluminum, essential to aircraft manufacture, the Army Quartermaster Corps indicated that its use for field range equipment, pack saddles, and ration boxes will be made of steel or other substitute material.

The Chilean government this week announced that MRC is paying 11.75c. a lb., c.i.f., United States ports for the refined copper production of Anaconda's and Kennecott's Chilean mines. Furthermore, an agreement has been signed by Chile to sell to the United States, through MRC, all copper, antimony, lead, mercury, tungsten, zinc, cobalt, manganese, gold, and silver that is exported for the next 18 months. Prices paid for these items will be adjusted semi-annually. In the meantime, MTV has entered into negotiations with other Latin American countries looking for the acquisition of additional supplies of vitally needed war metals. Among the first metals to be considered is copper, and negotiations are about completed for 600,000 tons of the red metal, valued at about $144,000,000.

The zinc trade is awaiting an official announcement of the February zinc pool that must be set aside for emergency requirements. In some quarters it is reported that the pool will amount to about 50 per cent of the November output, totaling 37,000 tons. The pool is expected to be high because Russia and China are seeking 10,000 tons of high-grade zinc in American markets under the lend-lease arrangements.

The Director of Priorities this week issued the nickel Conservation Order, M-6-b, prohibiting the use of nickel or nickel scrap except where necessary for operational purposes. Complete details of this order are given on Page 84.

A conservation and limitation order on tin cans and containers is now about ready for issuance. This order is expected to cut deeply into the available supplies of containers for food preservation, and direct the flow of such material into desired channels.

Lead producers met with WPB during the past week to determine lead allocations for February. While official word has not been forthcoming, it is believed that the tonnage agreed upon for allocation will be substantially the same as that distributed out of MRC's foreign lead supply during January. The February lead pool is expected to remain at 15 per cent.

Non-Ferrous Prices

(Cents per lb. for early delivery)

Copper, Electrolytic[1]	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis[2]	8.25
Lead, St. Louis[3]	6.35

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt; Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $199 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

SCORCHED TIN: It is difficult to determine from dispatches if the Hong Fat tin mine, Malaya, the largest in the world, has fallen into the hands of the Japs. The British have stated that any such property would be treated to a British version of the scorched earth policy, and all machinery, pitheads, facilities, and stocks destroyed, if it fell to the Jap invaders.

International News Photo

SCRAP

. . . MARKET ACTIVITIES AND PRICE TRENDS

WPB Acts to Spur Auto Wrecking; Plans Requisition Orders

Washington

• • • **Supervision over** the collection of iron and steel scrap from auto graveyards, where it is hoped to salvage between 4,000,000 and 5,000,000 old cars within six months, has been transferred by WPB Chairman Donald M. Nelson from the Iron and Steel Branch to the Bureau of Industrial Conservation.

Lessing J. Rosenwald, chief of the Bureau, announced a plan under which its field agents will comb the country for auto graveyards and request owners to proceed immediately to cut up cars and sell the scrap to dealers of their own choosing.

A procedure has been worked out so that a requisition order can be issued within 24-hr. in any cases where owners are recalcitrant. In such cases the government would take possession of the property and call for lump sum bids on all cars in the yard. A contract would then be awarded to the high bidder to cut and grade all scrap so obtained and the amount of the bid would be used by the government to establish a fair price to be paid the owner. Such a transaction would require from 30 to 90 days for completion.

In discussing the question of using the government power to requisition, Mr. Rosenwald said that he did not contemplate the necessity of widespread use of this authority. He pointed out that prompt agreement to clean out graveyards has been obtained from three owners.

The advantage to the graveyard operator in disposing of his cars voluntarily is great, Mr. Rosenwald said. Under a voluntary arrangement he is allowed a month or two to cut up his cars and dispose of the scrap at the best possible prices. He may remove salable parts from the cars, and he may retain later model automobiles if they can be repaired and sold for use.

Auto Wreckers Put Under Pressure; Mill To Furnish Labor

Pittsburgh

• • • **Armed with authority** to requisition auto wrecking yard scrap, the regional war production board and Army officals early this week were putting pressure on auto graveyards in an attempt to start this material flowing into the nation's steel mills and foundries.

On a test drive at Butler, Pa., WPB and Army officials contacted two auto wrecking companies who agreed to immediately sell old automobile car material. One firm is said to have argued that it had insufficient labor to begin cutting up the scrap immediately and to segregate certain parts but American Rolling Mill officials, who were also present on these visits, agreed in this case to furnish the necessary men. Another large yard was visited near Irwin, Pa., where the owner agreed to start cutting up about 2000 cars if he was able to get some labor. The labor was offered by American Rolling Mill Co.

According to Maj. John S. Swauger, assistant Army executive officer, Pittsburgh Ordnance district, a recheck will be made on all plants visited within a week or so to make certain the owner is living up to his promise.

Crusade Arouses Debate on Scrap

Philadelphia

• • • **For the past** several weeks, one of the newspapers here has been taking the scrap industry to task for not moving scrap metals to the mills more quickly. While some of the attacks on the scrap industry have been justified, the crusade has developed into one of destructive criticism and sensationalism that is doing more harm than good. True, it is attracting wide public attention, but has yet to offer a helpful suggestion as to how scrap may be collected, segregated, or moved in a better manner, and to a great extent has been based on an incomplete knowledge of the facts.

In an effort to get automobile scrap moving in and around the Philadelphia area, the Charles Dreifus Co. has been contacting auto wreckers to determine what is holding up the flow. In most instances, auto wreckers have expressed the need for labor to scrap cars, and Dreifus has offered to place labor and equipment necessary at their disposal, taking such costs into account in the buying price of the metal. Their efforts have not been confined to obtaining the scrap themselves, but urgent pleas have been made to get the metal moving into regular channels.

Flow of Material Steady; Production Of Steel Assisted

• • • **Despite adverse** weather conditions in many sections of the nation, several open hearth furnaces were able to resume operations this week, and the national ingot rate was holding fairly closely to last week's level. Meanwhile, the drive to get out more scrap, particularly from auto wreckers, was assuming more definite form.

In general, steel producers were receiving a reasonable volume of materials, although much pressure was being exerted to receive allocation orders and some mills were going far afield for material. Foundries in many areas reported increased difficulty getting scrap, however.

For additional comment on scrap, see "Washington" column in this issue. Also, article in news section on replies received from scrap survey, page 75.

OPA's new corps of scrap inspectors will watch bundles closely, in addition to misgraded cast and electric furnace grades. Black bundles must not contain coated sheets, according to the Dec. 23 price schedule. Tin can scrap, burned or unburned, must be bundled separately. In connection with the latter type of scrap, Buffalo this week reports mills there are placing a ban

on tin can scrap for open hearth use.

For their own protection, dealers are beginning to watch trucking charges closely on cast scrap. The tendency in recent weeks in some sections of the nation has been toward higher trucking rates.

The debate over scrap exports to Axis nations, which has flared frequently since the outbreak of war, is being answered with vigor by dealers who feel much of the criticism is unjustified.

One Eastern scrap authority pointed out last week that the scrap exported to Japan during depression years was surplus quantities and that United States mills at that time were selling scrap for export to Japan as well as pig iron. Furthermore, he said, very little appears about the enormous quantities of other materials shipped to Japan.

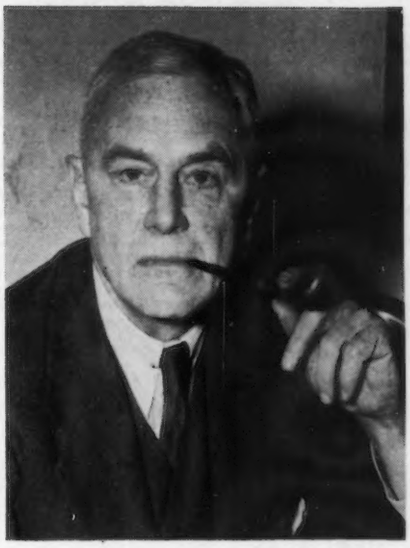
Still another scrap authority last week pointed out that "Just as the Japanese have converted American scrap into steel, so have the Japanese sold the United States silk, without which powder bags could not be made, and tin and rubber, which have now become so precious. . . . At the current rate of U. S. scrap consumption, all that was shipped to the Japs in eight years, would only last us two months.

"And this point is noteworthy," continued the authority. "If the United States had cut off exports of scrap to Japan earlier, the Japs would have built up a blast furnace industry and therefore would have been much better equipped today for raw materials for their steel industry."

The Fort Dodge Iron & Metal Co., Fort Dodge, Iowa, has agreed to abide by Price Schedule No. 4, and has contributed to the Treasury of the United States all amounts received by it in excess of the ceiling levels, OPA announced Jan. 21.

•

PITTSBURGH—Initial visits at Butler, Pa., by WPB and Army officials in their drive to dislodge auto graveyard material are said to have uncovered 750 old cars at two dealers' yards with approximately 100 to 150 auto motor blocks included in the lot. This material is to be prepared immediately and shipped out to the American Rolling Mill Co. at Butler, according to reports. Visits to other plants in the district were also being made. Meanwhile scrap collections and the flow of material in this district were no better than a week ago and several open hearths remained down for lack of material.



Wide World Photo

SCRAP CHIEF: Herbert L. Gutterson, Chief of the General Salvage program, is the man responsible for household salvage in the nation's drive to reclaim waste materials. Under his direction, arrangements are being made for states and municipalities to set up their own salvage committee, with scrap men having a prominent role.

NEW YORK—Despite a week of fair weather, scrap receipts were rather disappointing last week. No serious emergencies arose, however. Allocations have been only modest compared to other areas. In several instances along the seaboard, yards were ordered to yield material which they did not possess or could not prepare on the desired scale. Criticism being heaped on wreckers at Philadelphia has aroused widespread resentment here.

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BOSTON—Textile machinery cast is coming out of New Bedford and Fall River, Mass., and the Elm Woolen Mill, Tilton, N. H., has sold 200 tons. However, many textile looms scheduled to be scrapped are going back into production. Scrap in general continues to come into the market very slowly. As a rule, scrap shipped out of New England goes to Pennsylvania, but this week a Buffalo mill with three open hearth furnaces down obtained three or four carlots of scrap from a Providence, R. I., shipper.

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TORONTO—Improved weather has been reflected in better deliveries of steel scrap. Iron scrap is scarce. No stove plate is appearing on the market and most of the cast is from automobile wreckers.

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BUFFALO—Use of can scrap in open hearths has been banned by local steel plants. Experimenting with bundles including scrap from the municipal incinerator, plants ran into difficulties when cans that were not sufficiently detinned and some new cans got into the furnaces. To conserve scrap supplies, two of the three local mills have been using up to 75 per cent pig iron in open hearth operations, according to reliable reports. Bethlehem's Lackawanna plant still has six open hearths idle for lack of scrap. A letup in sub-zero weather has improved collections.

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CINCINNATI—Further requests for allocation of old materials in this district have been made to Washington, but so far no action is reported. With more moderate weather, the movement of scrap is easier. Very little talk of resistance to price schedules has been heard.

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MILWAUKEE—Obsolete equipment and other material lying unused in the yards of contractors, county highway departments and equipment distributors will be gathered under a scrap collection plan sponsored by the Wisconsin Road Builders' Association. The material will be sold through regular scrap dealers. A survey of the 160 wrecked car dealers in Wisconsin to ascertain how much scrap metal they have on hand in the form of junked cars has brought replies from 76 who indicate that early this month they had 3147 tons of scrap metal on hand and were dismantling 6018 discarded automobiles, according to Abe Malofsky, secretary of the OPM auto wreckers committee.

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ST. LOUIS—Intensive efforts by various agencies, including federal and state governments, have resulted in a freer flow of scrap. One mill was able to put on an additional open hearth which had been idle because of lack of scrap. Country dealers are collecting and shipping larger amounts than in some time, being helped by the most favorable January weather experienced in more than a decade. Apprehensive of stringent measures which the government may take to loosen up their large inventories, auto wreckers are beginning to dispose of their scrap more freely.

Scrap Prices on Next Page

Scrap Drive Yields 150 Tons in One Day

Birmingham

• • • Starting Jan. 23, a civic scrap collection drive here soon resulted in the gathering up of 200 tons of material, which was sold to dealers for $13 a ton. The $2,600 will be turned over to the Jefferson County Civilian Defense Council. On the opening day 45 city garbage and street department trucks brought in about 150 tons.

SCRAP PRICES

Revised to Dec. 23, 1941

(All the prices given below are per gross ton and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

	OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	Machine Shop Turnings	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	ELECTRIC FURNACE AND FOUNDRY GRADES											
				Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap			Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
				Billet, Bloom, Forge Crops	Bar Crops and Smaller	Punchings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under			
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	15.50	15.50	24.[illegible]	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.8[illegible]	20.35	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	13.50	13.50	22.50	22.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Ore.	.....	.....	.....	.....	15.50	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of South San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points, take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are taken for purposes of deducting. For exceptions see official order.

REMOTE SCRAP: Defined as all grades of scrap listed in table above (exclusive of railroad scrap) located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than $1, but not more than $5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than $5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be $2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap."

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails 3 ft. and Under	Scrap Rails 2 ft. and Under	Scrap Rails 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

Other Than Railroad Scrap

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Stove plate	14.00	15.00	16.00
Heavy breakable cast	16.50	17.50	18.50
Charging box size cast	17.25	18.25	19.25

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes all states not named in groups A and B.

. . . Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*)

(Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Jan. 27, 1942	Jan. 20, 1942	Dec. 29, 1941	Jan.28, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, bars	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Jan. 27, 1942	Jan. 20, 1942	Dec. 29, 1941	Jan.28, 1941
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.06	24.06	24.06	24.06
No. 2, Birmingham	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	30.34
Ferromanganese‡	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap: (Per Gross Ton)	Jan. 27, 1942	Jan. 20, 1942	Dec. 29, 1941	Jan.28, 1941
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$21.50
Heavy melt'g steel, Phila.	18.75	18.75	18.75	20.00
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	19.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	18.00
Low phos. plate, Youngs'n	23.00	23.00	23.00	24.50
No. 1 cast, Pittsburgh	22.00	22.00	22.00	22.25
No. 1 cast, Philadelphia	24.00	24.00	24.00	23.75
No. 1 cast, Ch'go*	21.00	21.00	21.00	18.75

*Changed to gross ton basis, April 3, 1941.

Coke, Connellsville: (Per Net Ton at Oven)	Jan. 27, 1942	Jan. 20, 1942	Dec. 29, 1941	Jan.28, 1941
Furnace coke, prompt	$6.125	$6.125	$6.125	$5.50
Foundry coke, prompt	6.875	6.875	6.875	5.75

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	Jan. 27, 1942	Jan. 20, 1942	Dec. 29, 1941	Jan.28, 1941
Copper, electro., Conn.*	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	50.15
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	5.70	5.70	5.70	5.35
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 108 to 114 herein.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

. . . Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Jan. 27, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.45 a Gross Ton	$20.42 a Gross Ton

	FINISHED STEEL High	FINISHED STEEL Low	PIG IRON High	PIG IRON Low	SCRAP STEEL High	SCRAP STEEL Low
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

A weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip. These products represent 78 per cent of the United States output. This revised index recapitulated to 1929 in the Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars **	Pacific Ports, Cars **	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		*3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes[2]	3.80¢		3.80¢									-4.55¢			
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled[4]	2.80¢	2.90¢					2.80¢	(Worcester = 3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢	3.31¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10						$5.32
BLACK PLATE															
29 gage [5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ ([10])			3.37¢
TERNES, M'FG.															
Special coated, basebox	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massilon, Canton = 2.70¢					2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont = 2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢([11])		2.45¢	2.65¢	2.25¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)						3.95¢	4.15¢		3.70¢	3.37¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.92¢
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.92¢
Spring	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)					3.80¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢
IRON BARS[12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributors. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] Boxed. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind., producer. **Gulf and Pacific Ports prices shown here do not apply if the customary means of transportation (rail and water) is not used.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland.	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

	Per Gross Ton
Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem	$54.00

TOOL STEEL

(F.o.b. Pittsburgh)	*Base per Lb.*
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal
Boston	$25.50	$25.00	$26.50	$26.00	.....	.....
Brooklyn	27.50	.....	.....	28.00	.....	.....
Jersey City	26.53	26.03	27.53	27.03	.....	.....
Philadelphia	25.84	25.34	26.84	26.34	.....	.....
Bethlehem, Pa.	**$25.00**	**$24.50**	**$26.00**	**$25.50**	.....	.....
Everett, Mass.	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....
Swedeland, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....
Steelton, Pa.	.....	**24.50**	.....	.....	**$29.50**	.....
Birdsboro, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	**29.50**	.....
Sparrows Point, Md.	**25.00**	**24.50**	.....	.....	.....	.....
Erie, Pa.	**24.00**	**23.50**	**25.00**	**24.50**	.....	.....
Neville Island, Pa.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Sharpsville, Pa.*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Buffalo	**24.00**	**23.00**	**25.00**	**24.50**	**29.50**	.....
Cincinnati	24.44	24.61	.....	25.11	.....	.....
Canton, Ohio	25.39	24.89	25.89	25.39	.....	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....	.....
St. Louis	24.50	24.02	.....	.....	.....	.....
Chicago	**24.00**	**23.50**	**24.50**	**24.00**	.....	....**$31.34**
Granite City, Ill.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Cleveland	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Hamilton, Ohio	**24.00**	**23.50**	.....	**24.00**	.....	.....
Toledo	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Youngstown*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Detroit	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	**$28.00**
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	**33.00**
St. Paul	26.63	.....	27.13	26.63	.....	.....
Duluth	**24.50**	.....	**25.00**	**24.50**	.....	.....
Birmingham	**20.38**	**19.00**	**25.00**	.....	.....	.....
Los Angeles	27.50	.....	.....	.....	.....	.....
San Francisco	27.50	.....	.....	.....	.....	.....
Seattle	27.50	.....	.....	.....	.....	.....
Provo, Utah	**22.00**	.....	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON

Valley or Pittsburgh furnace **$23.50**

***Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.**

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of basic grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. See THE IRON AGE, *Dec. 25, 1941, page 88, for details of OPA Price Schedule No. 49, covering steel resale prices. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. city prices are used in conformance with Schedule 49.)*

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.35	$3.25	$3.35	$3.75	$3.58	$3.43	$3.25	$3.71	$3.45	$3.39	$3.50	$3.38	$4.65
Sheets, cold rolled	....	4.10	4.05	4.05	4.60	4.30	4.30	4.68	....	4.24	4.90	4.23	6.85
Sheets, galvanized	4.65	4.85	4.62	5.00	5.00	4.84	4.75	5.11	4.75	4.99	5.00	4.98	5.85
Strip, hot rolled	3.60	3.60	3.50	3.95	3.96	3.68	3.82	4.06	3.70	3.74	3.85	3.73	5.00
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	....	3.61	3.83	3.54	....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.50
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.50
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.50
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.75	....	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.88	....	8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions; Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.43.

CORROSION AND HEAT-RESISTING STEELS

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.73c.	16.15c.	19.13c.	23.38c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	25.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 75c. per 100 lb.

*In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and Carriage Bolts:

6½ in., shorter and smaller	65½
6 x ⅝ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(hexagon or square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

Stove bolts in packages, with nuts attached 71

Stove bolts in bulk 80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	$3.05

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)

Base Price = $200 Per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld 8 in. and smaller.

CAST IRON WATER PIPE

Per Net Ton

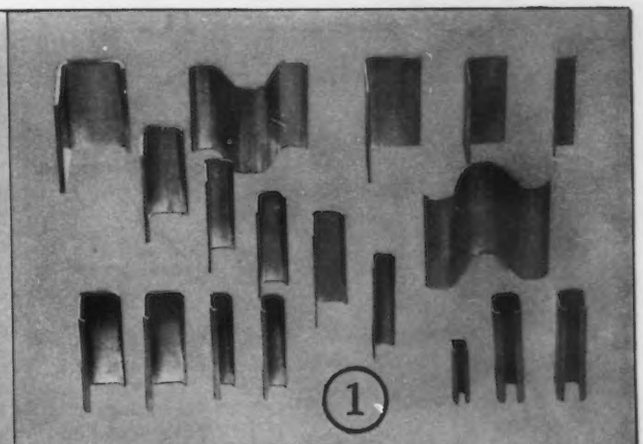
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

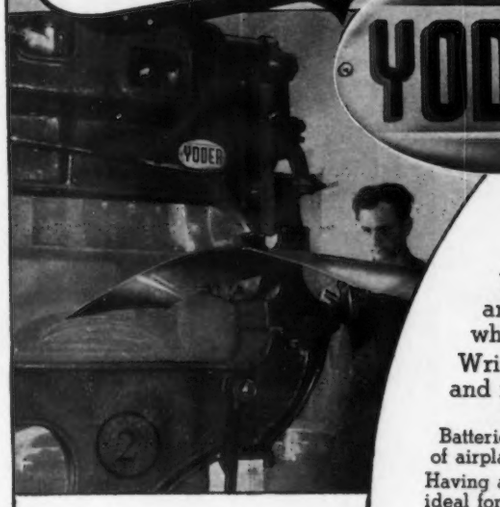
FUEL OIL

No. 3, f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	3.21c.
No. 6 Bur. Stds., del'd Chicago	4.50c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 6 indus., del'd Cleveland	5.00c.

More and Better **PLANES ARE FLYING** *because of these..*



YODER MACHINES



YODER MACHINES are vital factors in speeding the production of planes that *fly faster, carry heavier loads* of freight, men or bombs — have *greater fire power* and mount more effective weapons.

Yoder is aiding by greatly stepping up the production of parts that are lighter but sufficiently strong to withstand the terrific stresses to which they are subjected.

Write for literature or send sketches, blueprints or actual parts for study and recommendations by Yoder engineers.

★ ★ ★

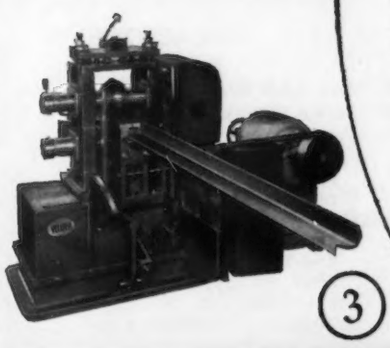
Batteries of YODER High Speed FORMING HAMMERS (2) are speeding the production of airplane thin metal parts for wings, fuselages, etc.

Having ability to strike up to twelve hundred 65 to 125 pound blows per minute, they are ideal for shaping sections to forms or correcting contours in die-formed parts. The spring accelerating and cushioning action of the hammer has proved very satisfactory in forming dural.

★ ★ ★

YODER Cam Type BENDING MACHINES (3) are in popular use in airplane plants for bending long roll-formed mouldings, longitudinal re-enforcing members, etc. to irregular curves. The straight mouldings are fed into the machine and emerge accurately curved to form.

YODER Vertical Shaft BENDING MACHINES (5) bend roll-formed or extruded mouldings to long irregular curves and also put twists in them if required. Forms are used in these machines.

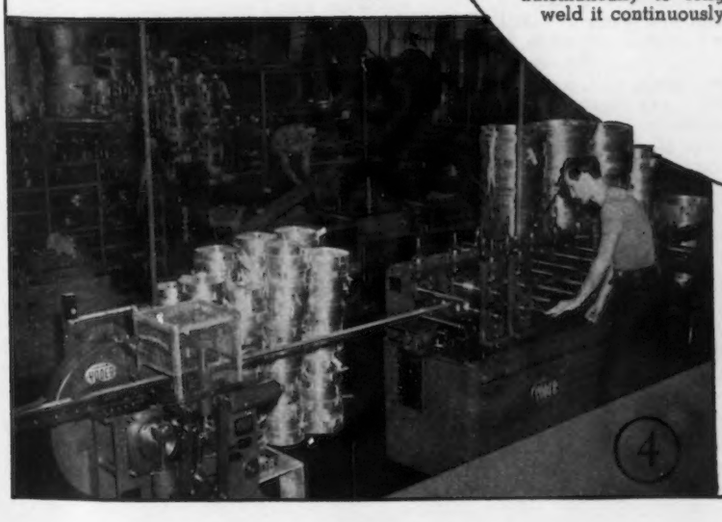


★ ★ ★

YODER Roll-Forming MACHINES (4) are speedily shaping in one continuous operation, many airplane members that were formerly produced by a series of slow operations. See a few such sections illustrated above. (1).

Yoder knowledge, based on pioneering development of successful roll-forming, has produced surprising results with dural, stainless steel and other metals indispensable to plane building.

YODER lines generally contain the roll-forming machine and a unit to cut the part automatically to length. Units are also available to pre-notch the stock or weld it continuously after being formed.



THE YODER COMPANY

5500 Walworth Ave.
CLEVELAND, OHIO

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads).....$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....$74.50
50% (ton lots, packed..... 87.00
75% (carload lots, bulk).....135.00
75% (ton lots, packed).....151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.O.B. Jackson, Ohio.....$29.50*
Buffalo $30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPACS price established June 24.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb. Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon.....13.00c.
2 carbon .....19.50c.
1 carbon .....20.50c.
0.10 carbon .....22.50c.
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon $113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload.... $2.00
Ferrotungsten, 100 lb. and less $2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... $2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton.....$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equalized with Rockdale, Tenn., gross ton..... $58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton..... $75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace..... 80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50.... $4.75
Old range, non-bessemer, 51.50 4.60
Mesaba, bessemer, 51.50..... 4.60
Mesaba, non-bessemer, 51.50... 4.45
High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, 46-48 Mn.....66.5c. to 68c.
Indian, 48-50 Mn. .....68c. to 70c.
Brazilian, 46-48 Mn.....67c. to 68c.
Cuban, 51 Mn 81c

Per Short Ton Unit

Tungsten, Chinese Wolframite, duty paid, delivered.....$24 to $26
Tungsten, domestic scheelite, at mine .....$24.00 to $25.00
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)..$28.00
Rhodesian, 45 .....Nom.
Rhodesian, 48 .....Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace *Per Net Ton*

†Connellsville, prompt $6.00

Foundry

†Connellsville, prompt .$6.75 to $7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago $12.25
By-product, New England.....$13.75
By-product, Newark..$12.40 to $12.95
By-product, Philadelphia $12.38
By-product, Cleveland $12.30
By-product, Cincinnati $11.75
By-product, Birmingham .....$8.50†
By-product, St. Louis.....$12.02
By-product, Buffalo $12.50

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton.....$40.00
Angle bars, 100 lb..... 2.70

(F.o.b. Basing Points) *Per Gross Ton*

Light rails (from billets).....$40.00
Light rails (from rail steel)... 39.00

Base per Lb.

Cut spikes ..... 3.00c.
Screw spikes ..... 5.15c.
Tie plates, steel..... 2.15c.
Tie plates, Pacific Coast..... 2.30c.
Track bolts, heat treated, to railroads ..... 5.00c.
Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....$25.00
Domestic, f.o.b. Ohio River landing barges 25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..... 25.00
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....$34.00
As above, in bags, f.o.b. same mines 36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick *Per 1000*

Super-duty brick, St. Louis...$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30
First quality, New Jersey..... 56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46.55
Second quality, New Jersey.... 51.00
No. 1, Ohio..... 43.00
Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania $51.30
Chicago District 58.90
Birmingham 51.30
Silica cement, net ton (Eastern) 9.00

Chrome Brick *Per Net Ton*

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester $76.00
Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks.....$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00

REVISED TO JAN. 26, 1942

SECTION TWO

THE IRON AGE

January 29, 1942

Allocations and Priorities Section

Prepared by the Priorities Staff of THE IRON AGE

What this guide contains—

1—Index to material and equipment under price or priority controls. Page 2.

2—Description of all priority and limitation orders. Page 4.

3—Description of PD forms to use with each order. Page 11.

4—Effective dates of orders. Page 4.

5—Expiration dates of orders. Page 15.

6—Preference rating assigned by order. Page 4.

7—How to extend priority orders. Page 10.

8—Price ceilings affecting the metal working industry. Page 17.

9—Locations of all priority field offices. Page 17.

10—Names of priority branches handling each order. Page 17.

11—Directory of personnel in WPB Materials, Production and other divisions. Page 18.

12—Procedure for reproducing forms and orders. Page 10.

• • •

How to use this guide—

• • •To determine what priority or price controls are in effect on a product, or material used by the metal working industry, first locate this product in the alphabetical index on page 2. This index will show all orders affecting the product. Locate these references either in the list of orders (P Orders, M Orders, etc.,) on pages 4 to 9; or if a price schedule, locate on page 17.

These lists of orders will tell briefly, the nature of any order affecting the metal working industry, when it went into effect, what forms to use to operate under the order and what preference rating has been assigned by the orders.

To determine the nature of the various forms which must be filed to operate under an order (these are listed under the column "Related Forms"), refer to the section, "Forms to Use with Priority Orders" on page 11.

If you are requested to file a form and want to know what order the form is connected with and what division of the Priorities Section handles the order, first refer to "Forms to Use with Priority Orders" on page 11. This will describe the form and the related order. You can then refer either to the "Description of Priority Orders" on page 4 to learn what the order contains, or to "WPB Directory," page 18. This tabulation also gives the expiration dates of the various orders. If you have received a priority order and want to know how to extend it to your suppliers, see "How to Extend P Orders," page 10.

If you want help or information on an order, inquire at the nearest priority field office, listed on page 17.

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HOW TO MAKE REVISIONS

Revisions for this IRON AGE Priorities Guide will be given to you each week in THE IRON AGE together with details of the new orders. This will be found on the Priorities and Prices page, which appears in every issue. This guide replaces other priority sections and charts appearing in THE IRON AGE previous to the issue of Jan. 29.

THE IRON AGE, 100 E. 42nd St., New York, N. Y.

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W BRITAIN-GRIDLEY • Machine Division - The New Britain Machine Co. • NEW BRITAIN, CONN.

Index to Material and Equipment

Symbols P, M, L, E and S refer to priority orders, pages 4 to 9; PS indicates a price schedule, pag

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O

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Office Furniture—L-13

P

Paint—P-65
Palm Oil—M-63
Paper Board—PS-32, L-11
Paper—PS-30, L-11, L-15
Paraffin Wax—PS-42
Petroleum Industry—P-83, P-98
Phonographs—L-21
Phenols—M-27
Phosphates—M-16
Phosphorus Oxychloride—M-35
Pig Iron—M-17, PS-10
Plates, Steel—P-92, General Allocation Order No. 1
Plumbago—M-63
Plumbing Supplies—M-67
Polyvinyl Chloride—M-10
Potassium—M-32, M-33
Priority Violations—S-1, S-2, S-3
Production Requirements Plan—P-90
Pulp, Wood—M-52, L-11

Q

Quicksilver—M-63

R

Radio Equipment—P-16, L-44
Rapeseed Oil—M-63
Radio Sondes—P-38
Rags—PS-47
Rail, Relaying—PS-46
Railroad Equipment—P-8, P-20, P-21
Reagent Chemicals—P-62
Rebuilt Machine Tools—P-77
Refining Plant Repairs—P-73
Refrigerants—M-28
Refrigerators—L-5, L-5-a, L-7, L-7-a
Repairs—
General—P-22, P-100
Farm Machinery—P-32
Canning Machinery—P-42
Utilities—P-46
Textile Machinery—P-53
Mines—P-56
Steel, Iron Plants—P-68
Elevators and Escalators—P-72
Metal Refining Plants—P-73
Heat Treating Equipment—P-74
Lift Trucks—P-40
Research—P-24, P-43, P-62
Resins—M-25
Resistance Welding—P-39, P-85
Rubber—M-4, M-13, M-15 to M-15-c, M-46, PS-56
Rutile—M-63

S

Scrap—
Aluminum—P-12, M-1-c, M-1-d, PS-2
Magnesium—M-2-b
Copper—M-9-b, PS-20
Vanadium—M-23-a
Iron and Steel—M-24, PS-4
Zinc—PS-3
Nickel—PS-8
Stainless—PS-8
Brass Mill—PS-12
Tin—M-72
Lead—M-72
Shipbuilding (including shipways)—P-7, P-10, P-14-a, P-14-b
Sodium Nitrate—M-62
Solenoid Assemblies—P-15
Solvents—M-41
South American Mines—P-58
Sperm Oil—M-40
Steel—
Prices PS-6, PS-49
Plant Repairs—P-68
Sheets for Drums—P-76, M-44
Nickel-Bearing—M-5-b
Tungsten Bearing—M-14, M-29
Vanadium Bearing—M-23-a
Chrome Bearing—M-18-a
Steel Mill Products—, Wrought Iron—, Alloy Steel— } M-21, M-21-a, M-21-b, PS-6, PS-41
Castings, etc.
Warehouses—M-21-b
Scrap—M-24, PS-4
Steel Plates—General Allocation Order No. 1
Stoves—PS-64
Superchargers—P-9-f
Suppliers—M-67, P-83
Synthetic Resins—M-25

T

Tackle Blocks—P-75
Tanks, Military—P-25-a to P-26-e
Textile Machinery—P-53
Tin—M-43. PS-17, M-72, L-25
Tin Foil—L-25
Tin Plate—see Dairy Equipment
Tires and Tubes, New—M-15-a, M-15-c, PS-63, PS-66
Titanium Dioxide—M-44
Toluene—M-34
Tools, Small—E-1-a
Trailers—P-54, P-57, L-1 to L-1-c
Training Classes—P-92
Trucks—P-54, P-107, L-35, L-1 to L-1-c, L-3 to L-3-e, L-4
Tubes, Rubber—M-15-c
Tung Oil—M-57, M-63
Tungsten—M-3, M-3-a, M-14, M-29, M-63

U

Utilities—P-46
U. S. Forest Service—P-45-a

V

Vacuum Cleaners—L-18, L-18-a
Vanadium—M-23, M-23-a, M-63
Vending Machines—L-27
Violations, Priority—S-1, S-2, S-3

W

Warehouses—M-21-b, P-83, M-67
Washers, Domestic—L-6, L-6-a
Wastepaper—L-15
Wax, Paraffin—PS-42
Weighing Machines—L-21
Welding—P-39, P-85, P-92
Wholesalers—M-67
Wood Pulp—M-52
Wrought Iron—M-21, M-21-a

Z

Zinc, Primary and Slab—M-11, M-63
Zinc Scrap—PS-3
Zirconium—M-63

Description of Priority Orders

(See "FORMS TO USE WITH PRIORITY ORDERS," page 11, for description of forms listed under column Related Form. See section "HOW TO EXTEND 'P' ORDERS," page 10, for explanation of extension procedure. Numbers in brackets refer to effective date.)

"P" Orders

Order Number	Material Covered	Related Form	Rating Assigned
P-1	Material for production of electric traveling cranes (3-12-41). *Revoked by P-5*		A-1-c
P-2 to P-2-s	Material for production of machine tools (3-28-41). *Revoked by P-11*	PD-6	A-1-a
P-3	Material for production of airframes (4-29-41)	PD-13	A-1-d
P-4	Material for production of airplane engines and propellers (4-29-41)	PD-14	A-1-c
P-5	Material entering into production of cranes and hydraulic bridge brakes (5-26-41). *Revokes P-1* Amendment (6-14-41).	PD-6	A-1-a
P-5-a	Material for production of cranes and hoisting equipment (8-1-41). *See P-5-b*		A-1-a
P-5-b	Material for production of cranes and hoisting equipment (10-1-41). *Supersedes P-5-a*	PD-81, PD-81-a, PD-88	A-10 or higher
P-6	Defense supplies rating plan (5-31-41). *Superseded by P-90*		
P-6-a	Civil aircraft, repair parts and accessories (7-21-41) Amendment (10-27-41). Amendment No. 2 (1-3-42) extends rating to civil air Patrol and police agencies.	PD-25-c-1, PD-25-c-2	A-10
P-7	Material and equipment entering into production of merchant ship construction (6-12-41).	PD-30, PD-30-a	A-1-a 1941; A-1-b 1942; A-1-c 1943
P-8	Material for freight car construction (6-18-41).	PD-38, PD-38-a	A-3
P-9-a	Material entering into the production of airframes for heavy bombers (6-26-41)	PD-43, PD-43-a	A-1-b
P-9-b	Aircraft engines for heavy bombers (6-26-41)	PD-44, PD-44-a	A-1-b
P-9-c	Aircraft propellers for heavy bombers (6-26-41)	PD-45, PD-45-a	A-1-b
P-9-d	Gun turrets for heavy bombers (6-30-41)	PD-46, PD-46-a	A-1-b
P-9-e	Gun sights, bomb sights, gunfire controls for heavy bombers (6-30-41)	PD-47, PD-47-a	A-1-b
P-9-f	Turbo superchargers for heavy bombers (6-30-41)	PD-48, PD-48-a	A-1-b
P-10	Material and equipment entering into conversion of ships (6-19-41)	PD-41, PD-41-a	AA
P-11	Material for production of metal working equipment (7-1-41). *Superseded by P-11-a*		
P-11-a	Material for production of metal working equipment (9-30-41). *Revokes P-11*	PD-42, PD-42a, PD-81, PD-81a, PD-88, PD-115	*
P-12	Aluminum scrap (6-26-41). *Revoked. See M-1-c*	PD-40	A-10
P-13	Material for production of airframes (7-3-41)	PD-52, PD-52a	A-1-b
P-14-a	Material and equipment for construction of shipways in 1941 (7-12-41)	PD-56, PD-56-a	A-1-a
P-14-b	Material and equipment for construction of shipways in 1942 and 1943 (7-12-41)	PD-56, PD-56-a	A-1-b
P-15	Material for electrical relays and solenoid assemblies (7-11-41)	PD-57, PD-57-a	A-1-d
P-16	Material for commercial radio receiving, transmitting and directional equipment (7-11-41)	PD-58, PD-58-a	A-1-c
P-17	Material for production of canning machinery (7-9-41). *Expired 8-31-41. See P-42, 42-a and 51*		A-2
P-18	Material entering into production of cutting tool equipment (7-31-41). *Revoked by P-18-a*		
P-18-a	Material for production of cutting tools (8-28-41). *Supersedes P-18*	PD-6 Rev.	A-1-a
P-19	Material for construction of defense projects outside of U. S. (7-18-41)	PD-63, PD-63-a	*

Order Number	Material Covered	Related Form	Rating Assigned
19-a	Material for construction of defense projects (limited to the Priorities Critical List) (7-18-41)	PD-68, PD-68-a	*
19-b	Material for construction of certain defense projects (7-30-41)	PD-68, PD-68-a	*
19-c	Material for specified publicly financed defense houses with protected delivery dates	PD-68, PD-68-a	*
19-d	Material for privately financed housing projects (9-9-41)		*
19-e	Material for highway projects (10-18-41)	PD-81	*
20	Material for construction of specified locomotives (7-21-41).	PD-64, PD-64-a	A-3
21	Material for repair and rebuilding steam, electric or diesel locomotives for railroad, mining and industrial use. (7-21-41)	PD-65, PD-65-a	A-3
22	Repairs (9-9-41). *Superseded by P-100*		
23	Materials for mining machinery (7-29-41). *Superseded by P-56-a*	PD-117	A-3
24	Material for experimental research work (8-5-41)	PD-74, PD-74-a	A-1-b
25-a	Parts, accessories and equipment for light tanks (8-11-41)	PD-81	A-1-f
25-b	Light tanks, spare parts and accessories (8-11-41)	PD-81	A-1-f
25-c	.30 cal. and 37 mm. guns for light tanks (8-11-41)	PD-81	A-1-f
25-d	Gasoline and diesel engines for light tanks (8-11-41)	PD-81	A-1-f
25-e	Material for production of light tanks (10-14-41)	PD-81	A-1-f
26-a	Parts, equipment and accessories for medium tanks (8-11-41)	PD-81	A-1-d
26-b	Medium tanks, spare parts, accessories, etc. (8-11-41)	PD-81	A-1-d
26-c	37 mm. and 75 mm. guns for medium tanks (8-11-41)	PD-81	A-1-d
26-d	Gasoline and diesel engines for medium tanks (8-11-41)	PD-81	A-1-d
26-e	Material for production of medium tanks (10-14-41)	PD-81	A-1-d

*As assigned.

Order Number	Material Covered	Related Form	Rating Assigned
P-29	Health supplies rating plan (8-25-41) Amendment No. 1 (9-30-41).	PD-79, PD-81	A-10
P-31	Materials for production of foundry equipment and repair parts (9-5-41)	PD-81	A-1-b
P-32	Parts for maintenance and repair of farm machinery (8-20-41). *Revoked by P-95*		
P-33	Farm machinery and equipment (8-20-41). *Revoked by P-95*		
P-35	Material for armored half track vehicles (12-5-41)	PD-81	A-1-b
P-38	Material for production of radiosondes (8-26-41)	PD-6, PD-6-a	A-1-d
P-39	Material for production of arc and resistance welding machines (9-12-41)	PD-81	A-1-c
P-40	Material for industrial lift trucks (10-14-41) Amendment No. 1 (12-30-41). Extends order to repair parts	PD-81	A-1-g A-1-g
P-41	Construction, maintenance, operation of facilities of Pan American Airways, Inc. (8-28-41)	PD-6	A-1-a
P-42	Maintenance and repair of canning machinery, equipment (8-21-41) Amendment No. 1 (9-30-41).	PD-88, PD-6-c, PD-6-a	A-3
P-42-a	Machinery and equipment of American Can Co. (9-12-41) Amendment No. 1 (9-30-41).	PD-6, PD-6-a, PD-88	A-7
P-43	Research laboratory supplies and equipment (8-28-41)	PD-93, PD-88, PD-107	A-2
P-45	Material for fire-fighting apparatus (10-31-41)	PD-81	A-2
P-45-a	Equipment, tools and supplies used by U. S. Forest Service (11-22-41)	PD-81	A-8
P-46	Repairs, maintenance for utilities (9-17-41). Amendment No. 1 (9-26-41). Amendment No. 2 (10-25-41). Amendment No. 3 (12-11-41). Prohibits certain expansions.	PD-193-a, PD-194-a, PD-195-a	A-10
P-47	Maintenance, repair of air transport facilities (9-6-41)	PD-96	A-3

Order Number	Material Covered	Related Form	Rating Assigned
P-51	Machinery and equipment for Food Machinery Corp. (9-22-41)	PD-6, PD-6-a	A-3
P-52	Material for aircraft accessories (9-15-41)	PD-81, PD-108	*
P-53	Textile machinery repairs and maintenance (9-13-41)	PD-81, PD-88	A-10
P-54	Material for specified types of trucks, passenger carriers, trailers (9-12-41)		A-3
	Amendment No. 1 (12-31-41).		
P-55	Defense housing projects (9-12-41)	PD-105, PD-105-b	*
	Amended (1-12-42) to provide for use of Production Requirements Plan (P-90) by manufacturers.		
P-56	Repairs for mines. *Revokes P-22 as provisions apply to mines* (9-22-41)	PD-119	A-1-a **
	Interpretation No. 1 (10-5-41)		A-8
	Amendment No. 3 (12-31-41) covers safety and defense equipment		A-3
P-56-a	Material for mining machinery (12-31-41). *Replaces P-23*	PD-25-a, PD-81, PD-81-a	A-3
P-57	Replacement parts for passenger cars, light trucks (9-18-41)		A-10
	Amendment No. 1 (1-23-42). Redefines "replacement parts."		
P-58	Supplies for specified South American mines (10-8-41)		A-3
P-61	Scrap for certain copper ingot makers, remelters (10-13-41). *Revoked by M-9-b Supplement*	PD-126	A-10
P-62	Material for laboratory equipment and reagent chemicals (11-15-41)	PD-82, PD-93, PD-93-a	A-5
P-65	Marine paints (12-5-41)	PD-81, PD-81-a, PD-82	A-1-b
P-68	Maintenance and repair supplies for steel industry (10-31-41)	PD-81, PD-148	A-3
	Amendment No. 1 (1-8-42). Order extended to cover Canadian mills operating in U. S.	PD-228, PD-81	A-3
P-71	Material for privately financed dwellings for which foundations were in place 10-9-41 (12-23-41)	PD-135	A-10
P-72	Material for elevator and escalator repair parts (11-10-41)	PD-81, PD-82	A-3
	Amendment (1-22-42). Extends order to Pan American companies. Interprets certain phases of order.		

Order Number	Materials Covered	Related Form	Rating Assigned
P-73	Repairs, maintenance, operation supplies for smelters and refiners of copper, lead, zinc, antimony, mercury and cobalt (12-22-41)		A-1-a h, A-3
P-74	Material for heat treating furnaces (11-22-41) Interpretation No. 1 (1-1-42) extends coverage to material for repair parts	PD-81	A-1-c
P-75	Material for tackle blocks (10-24-41)	PD-82	A-1-c
P-76	Sheet steel for drums (11-17-41)	PD-81, PD-156-a	A-4
	Amendment (12-31-42) extends use of rating to all types of sheets. *See M-45.*		
P-77	Material for rebuilding machine tools (11-10-41)	PD-81a, PD-81, PD-157, PD-179	A-1-c
P-78	Material for conveying machinery (11-10-41)	PD-81, PD-82-a	A-3
P-79	Hardware for cooperage and wooden container industry (11-14-41)	PD-81	A-5 or A-8
P-82	Material for products made by blind (11-29-41)	PD-81, PD-81-a, PD-166	A-8
P-83	Material stocked by petroleum industry suppliers (12-8-41)	PD-82, PD-82-a	A-8
P-85	Material for resistance welding electrodes (12-3-41)	PD-81, PD-81-a, PD-82	A-1-c
P-86	Material for industrial explosives (12-12-41)	PD-81, PD-81-a, PD-82	A-8
P-87	Material for insecticides, germicides, fungicides (12-13-41)	PD-81, PD-81-a, PD-82	A-10
P-90	Production Requirements plan (effective first quarter, 1942). *Supersedes P-6*	PD-25-a, PD-25-b	*
P-91	Material for elevators, escalators and dumbwaiters (12-30-41)	PD-25-a	A-2
P-92	Steel plate and electrodes for welders' training classes (1-17-42)	PD-183	*
P-95	Material for farm machinery and parts (12-27-41). *Supersedes P-32, P-33. See L-26*	PD-25-a, PD-81, PD-81-a	A-3
P-98	Material for petroleum industry (1-14-42). Does not apply to plants operating under P-43 or P-100		A-1-a h, A-10
P-98-a	Extends rating assigned by P-98 to firms outside U. S. (1-21-42).		

*As assigned. **Emergency repairs only.

Order Number	Materials Covered	Related Form	Rating Assigned
00	Repairs, maintenance and supplies (12-18-41). *Supersedes P-22. See P-46, P-56, P-68*		A-10
07	Replacement parts for medium and heavy trucks, truck trailers and busses (1-22-42). *See L-35*		A-3

"E" Orders

1. Machine tools (3-28-41). Supplement No. 1 (7-7-41). *Revokes E-1.*

1-a. Revises Master Preference Numerical list. *Supersedes E-1. Suspended 1-7-42.*

1-a Rev. Contains revised Master Preference Numerical list; gages and chucks included in order (1-15-42). *Supersedes E-1-a.*

2. Cutting tools. Amendment (7-25-41). *Revoked by E-2-a (7-17-41).*

2-a. Supplement (8-28-41). *Revokes E-2.*

"S" Orders

1. Suspends certain operations of pattern and aluminum foundry in Chicago (10-16-41).

2. Deprives a Brooklyn plumbing company of priority ratings, in both sales and purchases until Mar. 1, 1942 (12-20-41).

7. Dealer in secondary and scrap metals in Canton, O., deprived of priority ratings on sales and purchases, prohibited from accepting delivery or selling any type of aluminum until July 1, 1942 (12-20-41).

MISCELLANEOUS ORDERS

iorities Regulation No. 1 (8-27-41).
nendment (12-23-41) makes mandatory acceptance of all preference rated orders; other important changes respecting inventories effected.
iorities Regulation No. 2 (9-9-41).
iorities Regulation No. 3.
Revises procedure for using forms PD-1 to PD-5; authorizes use of new forms PD-1a and PD-3a (1-12-42).
neral Metals Order No. 1. (Terminated September 23, 1941. Restrictions imposed covered by Priorities Regulation No. 1).
ecial Allocation No. 1—Directs certain machine tool builders to accept specified orders for Russia (11-11-41).
neral Allocation Order No. 1—Steel Plates (11-29-41).

"L" Orders

Order Number	Subject	Related Form
L-1	Restricts production of motor truck and public passenger carriers (8-30-41) *Amended by L-1-2.*	PD-95
L-1-a.	Restricts production of medium motor trucks, truck trailers, passenger carriers and replacement parts (9-12-41). *Amends L-1.* Interpretation No. 1 (12-10-41) revises quotas of certain companies.	
L-1-c.	Prohibits sales of medium and heavy trucks except for defense use (1-8-42).	
L-2	Restricts production of passenger automobiles (9-13-41). Interpretation No. 1 (12-23-41). Exempts units made for specified defense agencies from quotas.	
L-2-a.	Supplement (10-24-41). December quotas.	
L-2-b.	Restricts use of bright work on automobiles after Dec. 15 (10-27-41). Amendment No. 1 (12-10-41) extends effective date of L-2-b to Dec. 31, 1941; exempts certain parts from requirements of L-2-b.	
L-2-c.	Supplement (11-7-41). January quotas.	
L-2-d.	Supplement (12-10-41). February quotas.	
L-2-e.	Revision of production schedules for December and January (12-24-41).	
L-2-f.	Restricts sales of passenger automobiles (1-1-42).	
L-3	Restricts production of light motor trucks (less than 1½ tons) (9-13-41). Interpretation No. 1 (12-23-41); exempts units made for specified defense agencies from quotas.	
L-3-a.	Supplement (10-24-41). December quotas.	
L-3-b.	Supplement (11-4-41). January quotas.	
L-3-d.	Prohibits sale or shipment of light trucks with spare or extra tire (12-31-41).	
L-3-e.	Restricts sales of light trucks.	
L-4	Restricts production of replacement parts used in repair of passenger automobiles and light trucks (9-19-41). Interpretation No. 1 (12-23-41). Exempts units made for specified defense agencies from quotas.	
L-4-a.	January, 1942, production schedule for light trucks for civilian use (11-14-41).	
L-5	Restricts domestic mechanical refrigerator production (9-30-41)	PD-125
L-5-a.	Excludes from quotas refrigerators made for specified war uses; January, February quotas (1-6-42).	
L-6	Restricts production of ironers and washers (10-29-41).	
L-6-a.	Extends original curtailment period to Jan. 31, 1942; sets further restrictions on February, 1942, production (12-12-41).	
L-7	Restricts production of non-mechanical ice refrigerators (10-29-41).	
L-7-a.	Excludes from quotas refrigerators made for specified war uses; increases rate of curtailment (1-6-42).	
L-8	Restricts distribution of motor fuel in Atlantic Coast area. *Revoked Oct. 24.*	
L-11	Restricts use of chlorine in pulp, paper and paperboard making (11-15-41).	
L-13	Restricts production of metal office furniture and equipment (11-7-41).	
L-15	Restricts use of waste paper in eastern mills (10-25-41). *Revoked Jan. 5, 1942.*	
L-16	Restricts electric power use in southeastern area (10-30-41). *Revoked, effective 1-5-42.*	
L-18	Restricts output of domestic vacuum cleaners (1-1-42).	

Order Number	Subject	Related Form
L-18-a	Supplement (1-1-42). Establishes quotas for 1st quarter 1942.	
L-20	Restricts use of cellophane and similar materials derived from cellulose (11-8-41).	
L-21	Restricts production of automatic phonographs, weighing, amusement and gaming machines (12-10-41)	PD-182
L-23	Restricts production of domestic cooking appliances (12-13-41)	PD-192, PD-203
L-25	Restricts use of tin and lead foil after Mar. 15, 1942 (11-24-41). *Revoked 1-15-42.*	
L-26	Restricts production of farm equipment; (12-28-41). *See P-95.*	
L-27	Restricts production of vending machines (12-31-41).	
L-35	Restricts output of replacement parts for trucks, busses (1-22-42). See *P-107.*	
L-44	Restricts output of radio and radio-phonographs (1-23-42).	

"M" ORDERS

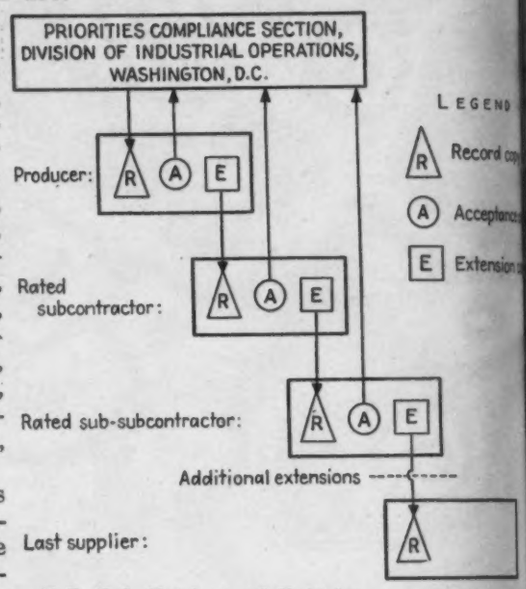
Order Number	Subject	Related Form
M-1	Aluminum (3-22-41)	
M-1-a	Supplement—schedule of ratings (3-22-41)	PD-8, PD-26, PD-26-a, PD-39, PD-40, PD-97, PD-114
M-1-b	Supplement modifies M-1 and M-1-a with respect to low grade deliveries (4-11-41). *Superseded by M-1-c*	
M-1-c	Supplement — directs distribution of scrap and secondary alumninum (6-10-41). *Revoked by M-1-d*	
M-1-d	Segregation of alumninum scrap by content and form made mandatory, beginning 3-1-42 (1-7-42). *Revokes M-1-c and P-12*	
M-2	Magnesium (3-24-41). *Superseded by M-2-b.*	
M-2-a	Supplement (3-24-41). Extends M-2	
M-2-b	Supplement—extends control over scrap, dead stock, etc. (11-14-41)	PD-26-m, PD-40-m, PD-173, PD-184
M-3	Tungsten (3-26-41)	PD-9
M-3-a	Supplement (3-26-41), preference rating schedule. *M-3 and M-3-a revoked by M-29*	
M-4	Neoprene (3-28-41). *M-4 expired 6-30-41; included under provisions of M-13*	PD-7, PD-36
M-5	Nickel-bearing steel (4-10-41)	PD-10, PD-11, PD-17, PD-18
M-5-a	Supplement (4-10-41). Amendment (4-30-41).	PD-27
M-5-b	Supplementary order (6-17-41). *M-5, M-5-a, M-5-b, revoked by M-21-a*	
M-6	Nickel (5-15-41). *Revoked by M-6-a*	PD-27
M-6-a	Primary nickel (9-30-41) *Supersedes M-6*	PD-31
M-6-b	Curtails use of nickel; sets controls over scrap, secondary metal (1-20-42).	
M-7	Borax and boric acid (6-9-41). *M-7 expired 8-30-41*	
M-8	Cork (5-31-41)	PD-28, PD-29, PD-51
M-8-a	Cork end products (10-1-41)	PD-196
M-9	Copper (5-29-41)	PD-12, PD-37, PD-59, PD-60, PD-60-a
M-9-a	Establishes full priority control over copper (8-2-41). *Supersedes M-9*	PD-37, PD-59-a, PD-60-a-b, PD-61, PD-76, PD-120, PD-121a-b, PD-123a-b, PD-175
M-9-b	Copper scrap and copper base alloy scrap (10-1-41). Supplement; prohibits scrap shipments without specific OPM authorization (12-31-41). *Revokes P-61.*	PD-130
M-9-c	Curtails use of copper in certain items (10-21-41). Amended (11-1-41). Amended (1-3-42). Exempts health supplies from restrictions.	PD-167, PD-169, PD-172, PD-189
M-10	Polyvinyl chloride (6-9-41)	PD-7, PD-33, PD-36
M-11	Zinc; sets up reserve pool (7-1-41)	PD-20, PD-50-a, PD-62, PD-94
M-11-a	July pool (7-1-41)	
M-11-b	August pool (8-1-41)	
M-11-c	September pool (9-1-41)	
M-11-d	October pool (10-1-41).	
M-11-e	November pool (11-1-41)	
M-11-f	December pool (12-1-41)	
M-11-g	January pool (1-1-42).	
M-13	Synthetic rubber (includes Neoprene) (6-9-41)	
M-14	Tungsten high speed steel (6-11-41)	
M-15	Rubber conservation (6-20-41)	
M-15-a	Supplement (6-27-41). July limitations Amendment (8-4-41). Amendment — white sidewall tires (8-8-41). Amendment (11-12-41).	
M-15-b	Rubber limitation order (12-11-41). Amendment No. 1 (12-19-41). Amendment No. 2 (12-27-41), re: fire hose.	
M-15-c	Restricts transactions in rubber tires, casing and tubes	
M-16	Tricresyl and triphenyl phosphates (8-30-41).	
M-17	Pig iron (8-1-41) Amendment revises date of filing of monthly reports (10-14-41)	
M-18	Chromium (7-7-41). Amendment (8-22-41)	

Order Number	Subject	Related Form
...a.	Extends priority controls, limits chromium oxide content of chemicals (11-29-41)..... Amendment No. 1 (1-13-42). Prohibits melting more than 2 tons of ferrochrome monthly without permission.	PD-53-a
...	Chlorine (7-26-41) Amendment No. 1 (12-20-41) establishes full allocation after (2-1-42).	PD-158-b-c PD-159-a-b-c
...	Calcium-silicon (7-29-41). *Revoked by M-20-a.*	
...a.	Calcium-silicon (11-29-41). *Supersedes M-20*..	PD-72
...	Steel (8-9-41)..... Amendment (9-9-41).	PD-73 PD-75 PD-99 PD-100 PD-169
...a.	Supplement—relating to alloy iron, alloy steel and wrought iron (9-16-41). Amendment No. 1 (11-25-41). Sets restrictions on production and sale of steel and iron with more than 3 per cent Cr. Amendment No. 2 (12-20-41). Prohibits melting alloy iron and steel containing specified elements except for orders rated A-10 or higher. *M-5, M-5-a, M-5-b, revoked by M-21-a.*	
...b.	Supplement—relating to steel warehouses (9-3-41)..... Directive; assigns A-9 rating to warehouse requirements (9-26-41). Amendment No. 1 (10-14-41). Amendment No. 2 (1-1-42). Revises method of establishing quarterly quotas.	PD-83-a to f
...d.	Supplement (12-27-41). Restricts shipments of corrosion or heat resistant alloy iron or steel with more than 4 per cent Cr.	PD-221
...	Vanadium (8-14-41.) *Revoked by M-23-a.*	
...a.	Sets allocations for vanadium, inc. ores, concentrates, ferro-alloys, pentoxide, scrap, etc. (12-20-41.) *Revokes M-23.*	PD-84
...	Scrap iron and steel (10-11-41)	PD-149 PD-150 PD-151
M-25...	Formaldehyde, para-formaldehyde, hexamethylene-tetramine and synthetic resins (8-23-41). Amendment (8-28-41). Amendment No. 2 (10-1-41). Amendment No. 3 (11-17-41). Amendment No. 4 (11-17-41).	
M-27...	Phenols (8-30-41).. Amendment (11-10-41).	PD-178-a-b PD-180 PD-162
M-28...	Chlorinated hydrocarbon refrigerants (8-22-41).	
M-29...	Tungsten (8-31-41). *Revokes M-3, M-3-a.*	PD-9
M-29-a.	Supplement (10-13-41); exempts purchasers of 100 lb. or less monthly from reporting requirements	PD-9
M-30...	Ethyl alcohol and related compounds (8-28-41). Amendment (11-12-41). Amendment No. 2 (1-7-42). Further restricts use and encourages substitution of corn or grain for molasses in production.	
M-31...	Methyl alcohol (8-28-41). Amendment (11-12-41). Amendment No. 2 (12-31-41). Prohibits use as an anti-freeze agent; assigns B-8 rating for certain uses.	
M-32...	Potassium perchlorate (8-28-41).	
M-33...	Potassium permanganate (8-28-41).	
M-34...	Toluene (8-28-41)..... Amendment No. 1 (12-30-41); establishes full allocation beginning Feb. 1, 1942.	PD-223 PD-224
M-35...	Phosphorus oxychloride (8-30-41).	
M-36...	Manila fiber and manila cordage (8-29-41)..... Amendment (8-14-31). Amendment No. 2 (12-19-41) sets further instructions on cordage sales.	PD-128 PD-129
M-38...	Lead allocation established, pool provided (10-4-41)	PD-66 PD-66-a PD-124
M-38-a.	Supplement (11-17-41) November pool.	
M-38-b.	Supplement (12-1-41). December pool.	
M-38-c.	Curtails use of lead in specified products (1-10-42).	
M-39...	Cobalt (11-4-41)	PD-152 PD-153
M-39-a.	Supplement (12-5-41). Waives certain forms.	
M-40...	Sperm Oil (8-16-41) ...	PD-185
M-41...	Chlorinated solvents, including carbon tetrachloride, trichlorethylene, perchlorethylene and ethylene dichloride (10-15-41)	PD-127
M-43...	Tin; control established over supplies, inc., afloats and imports. Purchases of less than 5 tons exempted (12-17-41) ..... Amendment No. 1 (1-13-42). Reduces exemption to 3 tons a month; re-defines term "distributer."	PD-213
M-43-a.	Restricts use of tin (12-31-41)	PD-229
M-44...	Titanium dioxide use as pigment restricted; pool established (1-1-42)... Amendment (1-7-42). Clarifies regulations in M-44.	PD-145 PD-146
M-45...	Sheet steel inventory for export drums. *See P-76* ..... Amendment No. 1 (12-31-42) permits use of any gage sheet and eliminates restrictions on type of product which may be exported in such containers.	PD-154 PD-155
M-46...	Chlorinated rubber (11-1-41)	PD-143 PD-144
M-47...	Burlap placed under full allocation, inc. imports (11-22-41). See order for effective date on import shipments) ..... Amendment No. 2 (1-19-42). Permits certain users to process small amounts.	PD-186 PD-187 PD-188
M-49...	Iridium use in jewelry curtailed (12-12-41).	

Order Number	Subject	Related Form
M-50	Restricts use of jewel bearings and materials (1-14-42)	PD-235, PD-236
M-51	Hog bristles more than 3 in. long reserved for military use (12-13-41).	
M-51-a	Supplement (1-7-42). Authorizes national inventory of bristles	PD-217
M-52	Sulphite pulp allocation order; pool provided (1-9-42).	
M-54	Molasses consumption restricted; prohibits use in beverage, spirits-making (1-7-42).	
M-57	Tung oil put under priority control (1-8-42).	
M-62	Full allocation control placed on sodium nitrate (1-13-42).	
M-63	Establishes control over imports of antimony, cadmium, chromium, copper, graphite, plumbago, kyanite, lead, quicksilver, rutile, tungsten, vanadium, zinc, zirconium (12-28-41). Amendment (1-9-42). Graphite, plumbago removed from list; lead added. Amendment No. 2 (1-13-42). Following material add to control list: Hides and skins, asbestos, rapeseed oil, cocoanut, palm and tung oil and copra.	PD-227-a, PD-222-b
M-65	Cadmium placed under full priority control (1-17-42).	
M-65-a	Curtails use of cadmium in certain items (1-17-42).	
M-66	Cashew nut oil placed under full priority control (1-13-42).	
M-67	Suppliers of plumbing, heating, electrical supplies (wholesale and retail, placed under Production Requirements Plan (1-3-42)	PD-25-a
M-68	Restricts use of materials for building new oil and natural gas wells (12-23-41) Amendment No. 1 (1-14-42). Permits completion of wells in process of drilling on 12-23-41.	PD-214-a, PD-214-b, PD-214-c
M-68-c	Prohibits construction of new facilities, including filling stations (1-14-42)	PD-215
M-69	Distilled beverages, making curtailed (1-10-42).	
M-72	Limits delivery of tin and lead scrap (1-8-42).	
M-79	Curtails use of asbestos from South Africa (1-20-42)	PD-251, PD-252, PD-253

How to Extend "P" Orders

• • •The procedure for extending General Preference Orders, or orders, from the prime contractor to subcontractor and from subcontractor to sub-subcontractor is outlined in the accompanying flow chart. This procedure is common to all "P" orders, except P-22, P-46, P-54, P-55, P-57, P-58, P-98 and P-100.



The following orders, in accordance with the specific terms of each order, require a single signature of producer or rated subcontractor: P-5a, P-6, P-11a, P-12, P-18a, P-19 to P-19e, P-20, P-21, P-23, P-25, P-25a to P-25e, P-26a to P-26e, P-29, P-31, P-32, P-33, P-39, P-41, P-41a, P-43, P-47, P-51, P-52, P-53, P-71, P-73, P-83, P-85, P-86, P-90, P-91, and P-92.

Following orders require both acceptance and certificate signed by the producer or subcontractor: P-7, P-8, P-14-a and P-14-b.

Orders which require an acceptance signed by the producer or rated subcontractor and a certificate signed by the Army or Navy contracting or inspecting officer are: P-3, P-4, P-9, P-9-a to P-9-f, P-13, P-15, P-[illegible] and P-24.

What Forms And Orders Can Be Reproduced

• • • Reproduction of priority forms and orders is permitted *only* in accordance with the following instructions: Any application form, including form PD-1 (but excluding PD-3a), any report form, including inventory report forms, and any "M" order, "L" order or "E" order may be reproduced.

As to "P" orders, two rules are to be followed:—

1. If the order is issued to a general class of persons, and does not name any individual as the recipient of the order (as is the case in P-100, the Repair Order) the order may be freely reproduced in the same manner as "M" orders.

2. If the "P" order has been issued for the use of specifically named firms or individuals, it may be reproduced for use either by the individual producer or by his suppliers who are entitled to use the order, by the photo-offset or similar photographic process. Such copies must be identical in size and every other respect with the order as issued by WPB. Blank forms of "P" orders may be reproduced for informational purposes only when they are stamped "Specimen" or "Sample," so as to make it clear that the copy is for information only and not for use.

These general instructions do not take precedence over any specific instructions or regulations which have been issued in connection with any specific order.

In the case of P-7, for example, specific instructions state that copies of the order must not be reproduced by ship builders, rated subcontractors or suppliers, but that all copies to be used must be obtained from the Chief of the Priorities Administration Branch of the United States Maritime Commission, Social Security Building, Washington, D. C. Similar instructions have been given in connection with P-14-a and P-14-b, issued to ship yards.

Whenever any form required by the WPB is reproduced, for whatever purpose, it must be reproduced in the exact format, language, color, type, size, and phraseology of the original.

Forms to Use With Priority Orders

Forms below are those in use at time of going to press. See column "Related Forms," pages 4 to 9

rm No.	Description
)-1	Obsolete after Feb. 2, 1942. *See PD-1-a.*
)-1-a	Application for preference rating in cases where PD-3-a is not applicable. Effective after Feb. 2, 1942. *May be reproduced.*
)-1-c	Application for rating to be used only by ship repair yards for inventory needed for ship repairs.
)-1c-a	Affidavit to accompany application for rating for inventory needed for repairs which are to be used by ship yards, facilities, chandlers and ships in service.
)-3	Obsolete after Feb. 2, 1942. *See PD-3-a.*
)-3-a	Application for preference rating for orders from Army, Navy, Coast Guard, Maritime Commission, Coast and Geodetic Survey, Panama Canal, National Advisory Committee on Aeronautics, Civil Aeronautics Authority, Office of Scientific Research and Development, Surplus Marketing Administration, and contracts or orders from foreign governments. Replaces, after Feb. 2, 1942, former PD-3, PD-4 and PD-5. *May NOT be reproduced.*
)-4	Obsolete after Feb. 2, 1942. *See PD-3-a.*
)-5	Obsolete after Feb. 2, 1942. *See PD-3-a.*
)-6	Manufacturers' monthly report of extension of preference rated orders.
)-6-a	Alternate of PD-6.
)-7	Producers' monthly report to OPM of synthetic rubber and plasticized resin requirements.
)-8	Aluminum priority rating index sent to aluminum suppliers as guide to scheduling deliveries.
)-9 Rev.	Users' monthly application for allocation of tungsten powder, ferrotungsten or tungsten compounds; re. M-29.
)-9-a	Report of consumption of tungsten for metallic uses and request for allocation for a given month; re. M-29.
)-9-b	Report of tungsten consumption for non-metallic uses and request for allocation for a given month; re. M-29.
)-9-c	Application for allocation of tungsten for metallic and non-metallic uses for delivery in a given month; re. M-29.
)-10	Request for nickel bearing steel, re. M-5.
)-11	Report of inventory of nickel bearing steel; re. M-5.
)-12	Report of copper and copper alloy products; re. M-9.
)-13	Producers or rated subcontractors monthly report of preference rated orders placed during a month; re. P-3.
)-14	Producers or subcontractors monthly report of preference rated orders placed during a month; re. P-4.
)-17	*Obsolete.*
)-18	Manufacturers' monthly report of receipts and shipments of nickel bearing steel; re. M-5-a.
)-19-a)-19-b	*Obsolete.*

Form No.	Description
PD-20	User's application for allocation of metals from Metals Reserve Co.
PD-21 PD-22 PD-23	*Obsolete.*
PD-24	OPM's Priorities Critical List.
PD-25	First report of requirements of scarce materials; re. Defense Supplies Plan.
PD-25-a	Standard form of subsequent report of requirements of scarce materials; re. Defense Supplies Plan.
PD-25-b	Manufacturers' report of extensions of Defense Supplies Rating Plan.
PD-25-c	Customers' certificate identifying order under Defense Supplies Rating Plan, filed monthly with supplier.
PD-25-d	Customer's certificate identifying order under Defense Supplies Rating Plan to accompany each order sent to supplier.
PD-25-e	Certificate of analysis of defense supplies business.
PD-25-f	Application for assistance in expediting delivery of material authorized under Production Requirements Plan.
PD-26	Report of proposed aluminum shipments filed monthly with OPM by fabricators, secondary smelters and producers; re. M-1.
PD-26-a	Producer's, secondary smelter's application for authorization to ship aluminum or aluminum products; re. M-1.
PD-27	Monthly application for allocation of nickel for melting purposes; re. M-6.
PD-28	Cork supplier's affidavit of compliance with special direction of OPM; re. M-8.
PD-29	Supplier's monthly report of cork inventories, deliveries, production and requirements; re. M-8.
PD-30	Producer's or rated subcontractor's monthly report on use of priority ratings for shipbuilding material.
PD-30-a	Alternate to PD-30.
PD-31	*Obsolete.*
PD-33	Synthetic rubber producer's monthly report of stocks, production and orders; re. M-13.
PD-36	Fabricator's monthly report on stocks, use and requirements of synthetic rubber and plasticized resin; re. M-13.
PD-37	Monthly report of production of duty-free refined copper; re. M-9-a.
PD-38	Producer's or subcontractor's monthly report of extension of preference rated orders for freight car material; re. P-8.
PD-38-a	Alternate to PD-38.
PD-39	Aluminum producer's monthly report of shipments (an informal questionnaire); re. M-1.
PD-40 Rev.	Aluminum buyer's quarterly report of inventories and consumption.
PD-41	Monthly report of extension of preference rated orders for material for ship conversion; re. P-10.
PD-41-a	Alternate to PD-41.

Form No.	Description
PD-42	Producer's or subcontractor's monthly report of extension of preference ratings for materials for metal working equipment; re. P-11.
PD-42-a	Alternate to PD-42.
PD-43	Producer's or subcontractor's monthly report of extension of preference ratings for material for bombers; re. P-9-a.
PD-43-a	Alternate of PD-43.
PD-44	Producer's or subcontractor's monthly report of extensions of preference ratings for material for bombers; re. P-9-b.
PD-44-a	Alternate to PD-44.
PD-45	Producer's or subcontractor's monthly report of extensions of preference ratings for material for bombers; re. P-9-c.
PD-45-a	Alternate to PD-45.
PD-46	Producer's or subcontractor's monthly report of extensions of preference ratings for material for bombers; re. P-9-d.
PD-46-a	Alternate to PD-46.
PD-47	Producer's or subcontractor's monthly report of extensions of preferences ratings for material for bombers; re. P-9-e.
PR-47-a	Alternate to PD-47.
PD-48	Producer's or subcontractor's monthly report of extensions of preference ratings for materials for bombers; re. P-9-f.
PD-48-a	Alternate to PD-48.
PD-49	Processor's monthly report of stocks, consumption and receipts of crude rubber; re. M-15.
PD-49-a	Importer's and dealer's monthly report on crude rubber; re. M-15.
PD-50	Customer's sworn statement to accompany each order for zinc; re. M-11.
PD-50-a	Producer's monthly statement of compliance with zinc order M-11.
PD-51	Monthly cork allocation; re. M-8.
PD-52	Producer's or subcontractor's monthly report of extensions of preference ratings for materials for airframes; re. P-13.
PD-52-a	Alternate to PD-52.
PD-53-a Rev.	Monthly application for chromium for melting (schedule 1); re. M-18.
PD-53-b Rev.	User's monthly report of chromium stocks and consumption; re. M-18.
PD-54 Rev.	User's monthly request for chromium chemicals; re. M-18.
PD-55	User's request for refractories containing chromium (one copy to producer, two to WPB).
PD-56	Producer's or subcontractor's monthly report of extension of preference ratings for materials for shipway construction; re. P-14-a and P-14-b.
PD-56-a	Alternate to PD-56.
PD-57	Producer's or subcontractor's monthly report of extensions of preference ratings for materials for electrical relays and solenoids; re. P-15.
PD-57-a	Certification of producer or subcontractor furnishing orders, listed in PD-57; re. P-15.
PD-58	Producer's or subcontractor's monthly report of extension of preference ratings for materials for radio equipment; re. P-16.
PD-58-a	Certification covering PD-58.
PD-59	Monthly application of supplier or consumer for allocation of copper for domestic consumption. See PD-59-a; re. M-9-a.
PD-59-a	Supplementary statement to be filed with copper application. Replaces PD-59.
PD-60	*Obsolete.*
PD-60-a	*Obsolete.*
PD-60-b	Fabricator's monthly report of inventory of copper for domestic consumption; re. M-9-a.
PD-61	Refiner's monthly report of production and shipments of duty-free refined copper; re. M-9-a.
PD-62	Consumer's monthly application for allocation of zinc oxide; re. M-11.
PD-63	Builder's or supplier's monthly report of extension of preference ratings for materials for defense projects; re. P-19.
PD-63-a	Certification to accompany orders furnished by builders or suppliers; re. P-19.
PD-64	Producer's or supplier's monthly report of extension of preference ratings for material for locomotives; re. P-20.
PD-64-a	Alternate to PD-64.
PD-65	Supplier's or repairshop's monthly report of extension of preference ratings for materials for locomotive repair; re. P-21.
PD-65-a	Alternate to PD-65.
PD-66	Report of lead user showing stocks, unfilled orders, consumption and estimated requirements; re. M-38.
PD-66-a	Consumer's monthly application for allocation of lead; re. M-38.
PD-67	*Obsolete.*
PD-68	Builder's or supplier's monthly report of extension of preference ratings for material for construction of defense projects; re. P-19-a.
PD-68-a	Alternate to PD-68.
PD-69	Consumer's monthly order for pig iron (to be sent to producer); re. M-17.
PD-70	Consumer's monthly report of inventory and consumption of pig iron (file with WPB); re. M-17.
PD-71	Pig iron producer's proposed monthly shipping schedule; re. M-17.
PD-71-a	Order setting pig iron reserve pool (sent to producer by WPB); re. M-17.
PD-71-b	WPB monthly authorization to pig iron producer to make shipments; re. M-17.
PD-71-c	WPB authorization (allocation) to pig iron producer to ship to an individual user; re. M-17.
PD-72	Consumer's monthly application for allocation of calcium-silicon; re. M-20.
PD-73	Customer's statement to steel producer (and WPB) classifying purchase order (must accompany each order); re. M-21.
PD-74	Monthly report of extension of preference ratings for material for experimental research work; re. P-24.
PD-74-a	Alternate to PD-74.
PD-75	Consumer's monthly request for alloy iron or steel.

Form No.	Description
PD-76	Copper refiner's monthly allocation report to WPB; re. M-9.
PD-79	Producers' report of requirements for health supplies, to accompany each request for rating under P-29.
PD-81	Monthly report of extension of preference ratings for material covered by various orders; to be made by person using the rating.
PD-81-a	Alternate to PD-81.
PD-82	Standard form of application for preference rating for deliveries of scarce material for various defense work.
PD-82-a	Application for priority rating by oil industry supply houses; re. P-83.
PD-83	Monthly steel warehouse report; re. M-21-b.
PD-83-a	*Obsolete.*
PD-83-b	Individual preference rating certificate for steel warehouse requirements; re. M-21-b.
PD-83-c	*Obsolete.*
PD-83-d	Classification instructions for steel warehouse monthly report on PD-83.
PD-83-e	Steel warehouse's request for change in "producers" supply products with A-9 rating; re. M-21-b.
PD-84	Vanadium report. *Superseded by PD-209-a and PD-209-b.*
PD-88	Standard form of application for preference rating.
PD-90	Obsolete.
PD-92	*Cancelled.*
PD-93	Purchaser's report of preference rated orders placed with supplier of scientific equipment; re. P-43.
PD-94	Monthly application for allocation of zinc; re. M-11.
PD-95	*Cancelled.*
PD-96	Buyer's application for preference rating for scarce materials for maintenance and repair of aircraft and equipment; re. P-47.
PD-97	Monthly report of radio parts maker concerning inventory and use of aluminum foil; re. M-1.
PD-99	Steel producer's monthly report of allocations, capacities and production schedule; M-21.
PD-100	Monthly report of steel producer (with more than one plant) on capacity, production and allocations; re. M-21.
PD-101	Producer's quarterly report of high speed steel orders and shipment; re. M-14.
PD-105 Rev.	Builder's application for preference rating for privately owned defense housing; re. P-55.
PD-105-b	*Superseded by PD-105 as revised 12-15-41.*
PD-107	Questionnaire to be filed by applicants for preference rating for material for research laboratories; re. P-43.
PD-108	Questionnnaire to be filed by producer concerning material for aircraft accessories; re. P-52.
PD-109	Foundryman's report of receipts, purchases and consumption of copper scrap for period Oct. 1 to Nov. 1, 1941; re. P-61.
PD-114	Application for authorization to enter into toll processing agreement covering aluminum; re. M-1.
PD-119	Mine operator's monthly report of use of priority ratings for material for mines; re. P-56.
PD-120	Monthly report of scrap dealer showing inventory of copper, lead, nickel, tin and zinc scrap.
PD-121-a	Smelter's monthly copper scrap inventory report; re. M-9.
PD-121-b	Foundry's monthly report of copper scrap inventory; re. M-9.
PD-123	Producer's monthly report of requirements of copper and copper alloys for December; re. M-9-a.
PD-123-a	Producer's monthly report of requirements of copper and copper alloys for January; re. M-9-a.
PD-123-b	Monthly report of deliveries of copper and copper alloys; re. M-9-a.
PD-124	Lead producer's proposed monthly shipping schedule; re. M-38.
PD-125	Manufacturer's monthly report concerning domestic mechanical refrigerators; re. L-5.
PD-126	Dealer's application for A-10 preference rating for deliveries of copper scrap; re. P-61.
PD-127	Purchaser's certificate covering chlorinate hydrocarbons to accompany each order; re. M-41.
PD-128	Processor's report covering board fibers and products; re. M-36.
PD-129	Importer's report covering board fibers and products; re. M-36.
PD-130	Melter's or processor's application for preference rating under order M-9-b.
PD-131	Report of adjustments under L-8.
PD-132	*Obsolete.*
PD-133	Primary and secondary supplier's certificate of compliance with L-8.
PD-134	Monthly report covering metal office furniture and equipment inventories and production and metal inventories, receipts and consumption; re. L-13.
PD-134-b	Report of production and inventories and steel in finished items of metal office furniture and equipment; re. L-13.
PD-135	Application for priority rating to complete privately financed dwellings whose foundations were in place 8-9-41; re. P-71.
PD-136	Application for conversion of weights of metal other than steel to an equivalent weight of steel; re. L-13.
PD-143	Fabricator's monthly report of chlorinated rubber requirements; re. M-46.
PD-144	Fabricator's monthly report of chlorinated rubber receipts, consumption, inventories and requirements; re. M-46.
PD-145	Application for specific allocation of titanium pigments; re. M-44.
PD-146	Manufacturer's certificate concerning titanium pigments; re. M-44.
PD-148	Application for preference rating for scarce materials for iron and steel plant operation; re. P-68.
PD-149	Monthly report of iron and steel scrap producer; re. M-24.
PD-150	Monthly report of iron and steel scrap consumer; re. M-24.
PD-151	Monthly report of iron and steel scrap broker or dealer; re. M-24.
PD-152	Monthly application for allocation of cobalt for metallic uses; re. M-39.

Form No.	Description
PD-153....	Monthly application for allocation of cobalt chemicals for non-metallic uses; M-39.
PD-154-a..	Order for reservation of sheet steel for container making; re. M-45.
PD-155-a..	Authorization to process steel for containers, re. M-45.
PD-156-a..	Application for preference rating for steel sheets for drums; re. P-76.
PD-157....	Report of sales of rebuilt machine tools; re. P-77.
PD-158-b..	*Obsolete.*
PD-158-c..	*Obsolete.*
PD-159-a..	Producer's monthly report of chlorine production; re. M-19.
PD-159-b..	Distributor's monthly report of distribution of chlorine sales; re. M-19.
PD-159-c..	Consumer's monthly report of chlorine use in his own plant; re. M-19.
PD-160....	Purchaser's monthly certificate of necessity for freon refrigerants; re. M-28.
PD-162....	Factory receipts, consumption and stocks of freon refrigerants; re. M-28.
PD-164....	Producer's monthly report of production, stocks and sales of freon refrigerants; re. M-28.
PD-165....	Request for name of supplier of material covered by PD-1.
PD-166....	Application for priority rating for material for blind-made products; re. P-82.
PD-167....	Copper user's request for relief under hardship clause of copper conservation order: re. M-9-c.
PD-169....	Producer's monthly steel plate rolling schedule; re. M-21.
PD-170....	Manufacturer's monthly report on domestic vacuum cleaner production; re. L-18.
PD-171....	*Cancelled.*
PD-172....	Application for permission to use copper or copper alloy material in stocks affected by order M-9-c.
PD-173....	Monthly report of producers, approved smelters and fabricators of magnesium and magnesium products; re. M-2-b.
PD-174....	Report of magnesium powder received, shipped and inventories, and disposition of scrap; re. M-2-b.
PD-175....	Customer's statement to supplier of copper or copper base alloy products concerning end use of copper ordered; re. M-9-a.
PD-176....	*Obsolete.*
PD-177....	Manufacturer's monthly report of domestic ice refrigerator production; re. L-7.
PD-178-a..	Phenol allocation report (revised monthly); re. M-27.
PD-178-b..	Phenol allocation report; re. M-27.
PD-179....	Application for preference rating for material for rebuilding machine tools; re. P-77.
PD-180....	Consumer's monthly application for allocation of phenols; re. M-27.
PD-182....	Manufacturer's monthly report of production of automatic phonographs, etc.; re. L-21.
PD-183....	Application for preference rating for steel plates and electrodes for welders' training classes; re. P-92.
PD-185....	Report of inventory and consumption of sperm oil; re. M-40.
PD-186....	Report of sales and inventories of burlap by importer, importing bag manufacturer and non-importing bag maker; re. M-47. (Initial report.)
PD-188....	Monthly report of sales and inventories of burlap by importers, importing bag makers and non-importing bag makers; re. M-47. (Subsequent reports.)
PD-189....	Report required under paragraph (a) (4) (iv) of copper conservation order M-9-c.
PD-190....	Consumer's certificate to accompany all orders for chlorine; re. M-19.
PD-191....	Producer's monthly report of proposed schedule of chlorine shipments; re. M-19.
PD-191-a..	Chlorine producer's delivery schedule; re. M-19.
PD-192....	Manufacturer's report of activities; re. L-23.
PD-193-a....	Schedule of withdrawals and amount of stores or inventories (water systems); re. P-46.
PD-194-a..	Electric utility's report of withdrawals and inventories; re. P-46.
PD-195-a..	Natural and manufactured gas utility's report of withdrawals and inventories; re. P-46.
PD-200....	Application for rating for defense project; re. P-19.
PD-200-a..	Project material list; re. P-19.
PD-203....	Appeal for relief from terms of order curtailing cooking, heating appliance production; re. L-23.
PD-212....	Application for priority rating for material for smelters and refiners of specified metals; re. P-73.
PD-213....	Application for allocation of tin for January, 1942; re. M-43.
PD-214-a PD-214-b PD-214-c PD-215	Request for permission to expand or construct oil producing facilities; re M-68-c (issued by Office of Petroleum Coordinator).
PD-217....	Report of stock of hog and pig bristles; re. M-51-a.
PD-221....	Report to be filed by all owners (except warehouses) of iron or steel having more than 4% Cr; re. M-21-d.
PD-222-a..	Application for instructions concerning contracts for imported material affected by order M-63.
PD-222-b..	Report to Metals Reserve Co. concerning contracts for imported materials when such has not yet arrived; re. M-63.
PD-223....	Purchaser's certificate to accompany each order for toluene; re. M-34.
PD-224....	Toluene producer's monthly schedule of proposed shipments; re. M-34.
PD-228....	Semi-annual report of steel producer operating under amendment No. 1, to order P-68.
PD-229....	Appeal for relief from terms of tin conservation order M-43-a.
PD-235....	Supplier's monthly report of inventories of jewel bearings and material; re. M-50.
PD-236....	Consumer's monthly report on use of jewel bearings and materials; re. M-50.
PD-251 PD-252	Monthly report of asbestos manufacturer or processor; re. M-79.
PD-253....	Same as PD-251 and 252, except it is filed only upon request.

Priority Supervising Branches

(Expiration dates of orders: Branches to which inquiries may be sent)

Order Number	Subject	Supervising Branch	Expiration Date
P-1	Electric cranes..	*Superseded by P-5.*	
P-2	Machine tools...	*Superseded by P-11*	
P-3	Airframes	Aircraft	3-31-42
P-4	Airplane engines, propellers	Aircraft	3-31-42
P-5	Cranes	*Superseded by P-5-b*	
P-5-a			
P-5-b	Cranes	Tools	5-1-42
P-6	Defense Supplies	*Superseded by P-90.*	
P-6-a	Civil aircraft repairs, etc.	Defense Supplies...	Varies
P-7	Merchant ships..	Maritime Commission	Varies
P-8	Freight cars ...	Automotive	3-31-42
P-9	Aircraft parts ..	Aircraft	3-31-42
P-9-g			
P-10	Ship conversion.	ANMB	Varies
P-11	Metal working equipment	*Superseded by P-11-a*	
P-11-a	Metal working equipment	Tools	3-31-42
P-12	Aluminum scrap.	*Revoked by M-1-d..*	
P-13	Airframes	Aircraft	3-31-42
P-14-a	Shipways	Maritime Commission	Varies
P-14-b			
P-15	Relays, solenoids.	Aircraft	3-31-42
P-16	Radio equipment.	Electrical Appliances	3-31-42
P-17	Canning machinery	*Expired Aug. 31, 1941*	
P-18	Cutting tools ...	*Superseded by P-18-a*	
P-18-a	Cutting tools ...	Tools	2-28-42
P-19	Defense projects.	Project Rating	Varies
P-19-a			
P-19-b			
P-19-d	Defense housing.	Housing Priorities.	4 months from issuance
P-19-e	Road projects...	Project Rating	3-31-42
P-19-g	Housing projects.	Lumber and Materials	7-31-42
P-20	Locomotives	Automotive	3-31-42
P-21			
P-22	Repairs	*Superseded by P-100*	
P-23	Mining machinery	*Superseded by P-56-a*	
P-24	Research work ..	Aircraft	2-28-42
P-25-a to P-25-e	Light tank parts.	Tanks and Combat Vehicles...	3-31-42
P-26-a to P-26-e	Medium tanks...	Tanks and Combat Vehicles...	3-31-42
P-29	Health supplies .	Health Supplies....	Until revoked
P-31	Foundry equipment	Tools	5-30-42
P-32	Farm machinery.	*Superseded by P-95.*	
P-33			
P-35	Armored vehicles	Tanks and Combat Vehicles...	3-31-42
P-38	Radiosondes	Ordnance	2-28-42
P-39	Welding machines	Tools	3-15-42
P-40	Lift trucks	Automotive	1-10-42
P-41	Defense project..	Aircraft	3-31-42
P-42	Canning machinery	Food	12-1-41
P-42-a	Canning machinery	Food	3-12-42
P-43	Research laboratories	Chemicals	2-28-42
P-45	Fire fighting equipment	Safety and Technical Equip....	1-31-42
P-45-a	Forest service ..	Safety and Technical Equip....	5-31-42
P-46	Utilities	Power	3-31-42
P-47	Air transportation	Aircraft	Varies
P-51	Canning machinery	Food	3-18-42
P-52	Aircraft parts...	Aircraft	3-31-42
P-53	Textile machinery	Textile Machinery	3-1-42
P-54	Motor trucks ...	Automotive ..... Priorities	1-31-42
P-55	Defense housing.	Field Service	Varies
P-56	Mines	Mine Priorities	4-30-42
P-56-a	Mining machinery	Mine Priorities	Until revoked
P-57	Automobile parts	Automotive	6-30-42
P-58	Specified copper mines	Copper	9-30-42
P-61	Copper scrap ...	*Revoked by M-9-b*	
P-62	Laboratories ...	Chemicals	3-31-42
P-65	Marine paints ..	Chemicals	Until revoked
P-68	Iron steel plants.	Iron and Steel.....	6-30-42
P-71	Housing projects.	Lumber and Building Materials.	4-1-42
P-72	Elevators and escalators	Industrial and Office Machinery...	Until revoked
P-73	Smelters	Mine Priorities	Until revoked
P-74	Heat treating furnaces	Tools	5-15-42
P-75	Tackle blocks ..	Production Requirements	Until revoked
P-76	Metal containers.	Containers	5-30-42
P-77	Rebuilt machine tools	Tools	4-1-42
P-78	Conveying machinery	Industrial and Office Machinery...	1-31-42
P-79	Non-metal containers	Containers	3-31-42
P-82	Blind made products	Housing Supplies...	4-30-42
P-83	Petroleum industry	OPC	Until revoked
P-85	Welding electrodes	Tools	Until revoked
P-86	Explosives	Chemicals	Until revoked
P-87	Insecticides	Chemicals	Until revoked
P-90	Production Requirements	Production Requirements	Varies
P-91	Elevators, etc...	Industrial and Office Machinery...	Until revoked
P-95	Farm machinery.	Automotive	10-31-42
P-98	Refineries	OPC	Until revoked
P-100	Repairs	Maintenance and Repairs	Indefinite

M Orders

M-1 to M-1-c	Aluminum	Aluminum and Magnesium	1-31-42
M-2 to M-2-b	Magnesium	Aluminum and Magnesium	4-30-42
M-3	Tungsten	*Superseded by M-29*	
M-3-a			
M-4 to M-4-b	Neoprene	*Superseded by M-13*	
M-5	Nickel steel	*Superseded by M-21-a*	
M-6	Nickel	Nickel	3-31-42
M-6-a			

Order Number	Subject	Supervising Branch	Expiration Date
M-7, M-7-a	Borax, boric acid.	*Expired Aug. 30, 1941*	
M-8, M-8-a	Cork	Cork and Asbestos	3-31-42
M-9, M-9-a	Copper	Copper	6-30-42
M-9-b	Copper scrap	Copper	3-31-42
M-9-c	Copper conservation	Copper	Until revoked
M-10	Polyvinyl chloride	Chemicals	Indefinite
M-11 to M-11-f	Zinc	Copper	3-31-42
M-11-g	Zinc	Copper	Indefinite
M-13	Synthetic rubber.	Chemicals	Until revoked
M-14	Tungsten steel.	Iron and Steel	12-31-42
M-15, M-15-a	Rubber	*Expired*	
M-15-b	Rubber products.	Rubber	Indefinite
M-15-c	Rubber tires, tubes	OPA	Indefinite
M-16	Specified phosphates	*Expired*	
M-17	Pig iron	Iron and Steel	12-31-42
M-18, M-18-a	Chromium	Manganese and Chrome	4-30-42
M-19	Chlorine	Chemicals	Indefinite
M-20, M-20-a	Calcium silicon.	Manganese and Chrome	5-31-42
M-21 to M-21-b	Steel	Iron and Steel	12-31-42
M-21-d	Chromium steel.	Iron and Steel	Indefinite
M-23, M-23-a	Vanadium	Tungsten	6-30-42
M-24	Iron and steel scrap	Iron and Steel	6-30-42
M-25	Specified chemicals	Chemicals	Until revoked
M-27	Phenols	Chemicals	7-31-42
M-28	Refrigerants	Chemicals	Until revoked
M-29, M-29-a	Tungsten	Tungsten	6-30-42
M-30	Ethyl alcohol	Chemicals	Until revoked
M-31	Methyl alcohol.	Chemicals	7-31-42
M-32	Potassium perchlorate	*Expired*	
M-33	Potassium permanganate	*Expired*	
M-34	Toluene	Chemicals	Until revoked
M-35	Phosphorous oxychloride	*Expired*	
M-36	Manila fiber	Textile and Clothing	2-28-42
M-38, M-38-a, M-38-b	Lead	Tin and Lead	3-31-42
M-39, M-39-a	Cobalt	Tungsten	3-31-42
M-40	Sperm oil	Chemicals	Until revoked
M-41	Specified solvents	Chemicals	3-31-42
M-43	Tin	Tin and Lead	7-31-42
M-43-a	Tin	Tin and Lead	Until revoked
M-44	Titanium pigments	Chemicals	Until revoked
M-45	Drum steel	Containers	6-30-42
M-46	Chlorinated rubber	Chemicals	7-31-42
M-47	Burlap	Textile, Clothing, Equipage	Until revoked
M-49	Iridium	Miscellaneous Minerals	11-30-42
M-51	Pig, hog bristles.	Textile, Clothing, Equipage	Indefinite
M-63	Imports	Coordinated by Stockpile, Shipping.	Indefinite
M-68	Petroleum	Imports Branch.	Until revoked
M-92	Training welders.	OPC	6-30-42

L Orders

Order Number	Subject	Supervising Branch	Expiration Date
L-1 to L-4	Cars, trucks and buses	Automotive	Until revoked except L-2 which expires June 30, 1942
L-5, L-5-a	Refrigerators	Consumers Durable Goods	Until revoked
L-6, L-6-a	Laundry equipment	Consumers Durable Goods	Until revoked
L-7	Refrigerators	Consumers Durable Goods	Until revoked
L-8	Motor fuel	*Terminated 10-24-41*	
L-11	Pulp, paper	Pulp and Paper	Indefinite
L-13	Metal furniture.	Consumers Durable Goods	Until revoked
L-15	Waste paper	*Expired 11-22-41*	
L-16	Electric power.	Power	2-28-42
L-18	Vacuum cleaners.	Consumers Durable Goods	Until revoked
L-20	Cellophane	Conservation Bureau	Until revoked
L-21	Amusement machines	Consumers Durable Goods	Until revoked
L-23	Cooking appliances	Consumers Durable Goods	Until revoked
L-25	Tin, lead foil.	Tin and Lead	Until revoked
L-26	Farm machinery.	Automotive and Farm Machinery	10-31-42
L-27	Vending machines	Elec. Appliances and Consumers Durable Goods	Indefinite

E Orders

Order Number	Subject	Supervising Branch	Expiration Date
E-1, E-1-a	Machine tools	Tools	Until revoked
E-2, E-2-a	Cutting tools	Tools	Until revoked

Miscellaneous Orders

Priorities Regulation No. 1		Indefinite
Priorities Regulation No. 2		Indefinite
Priorities Regulation No. 4		Indefinite
General Allocation Order No. 1, steel plates	Iron and Steel	Until revoked

How to Address Priority Reports and Inquiries

• • • If you are required to file a priority report or make an inquiry to the Priorities Compliance Section, address the envelope as follows: "Priorities Compliance Section, Division of Industrial Operations, Social Security Building, Washington, D. C. Ref: . . . (insert here the number of the order concerned, as P-68, L-2, M-63, etc.). Using this procedure will speed up handling of your letter in Washington.

Field Offices of WPB Division of Priorities

Field offices are organized to assist industry answer problems arising from the application of the priorities system. Consult these offices before taking your problems to Washington. Listed below are the addresses of all offices opened to date and the names of the office managers.

Alabama

INGHAM
oenix Bldg., M. J. Lide.

Arizona

ENIX
curity Bldg., C. S. Jamison.

Arkansas

LE ROCK
ctor Office Bldg., C. S. Christian.

California

ANGELES
26 Western Pacific Bldg., F. R. McGregor.
FRANCISCO
55 Market St., C. Pool.

Colorado

VER
S. National Bank Bldg., Virgil L. Board.

Connecticut

RTFORD
oenix-Bank Bldg., E. L. Howard.

Florida

CKSONVILLE
0 Lynch Bldg., G. H. Andrews.
MPA
Wallace South Bldg., H. E. Brennan.

Georgia

LANTA
50 Hurt Bldg., John B. Reeves.

Illinois

ICAGO
0 North Wacker Drive, M. R. MacDonald.

Indiana

DIANAPOLIS
Circle Tower Bldg., Albert O. Evans.

Kentucky

UISVILLE
odd Bldg., 4th and Market Sts., James T. Howington.

Louisiana

W ORLEANS
20 Canal Bldg., John A. Bechtold.

Maryland

BALTIMORE
Baltimore Trust Bldg., T. M. Chandlee.

Massachusetts

BOSTON
19 Congress St., D. T. Hood.

Michigan

DETROIT
7310 Woodward Ave., E. H. Eitel.

Minnesota

MINNEAPOLIS
326 Midland Bank Bldg., Willard F. Kiesner.

Missouri

KANSAS CITY
Federal Reserve Bank Bldg., C. B. Shaeffer.
ST. LOUIS
314 N. Broadway, W. H. Goodloe.

Montana

HELENA
Power Block House, Oscar A. Baarson.

Nebraska

OMAHA
Grain Exchange Bldg., R. H. Fair.

New York

BUFFALO
M & T Bank Bldg., Paul R. Smith.
NEW YORK
122 E. 42nd St., S. Hogerton.

North Carolina

CHARLOTTE
Liberty Life Bldg., J. E. MacDougall.

Ohio

CINCINNATI
34 E. Fourth St., J. B. Harvey.
CLEVELAND
East 6th St. and Superior Ave., W. T. Walker.
DAYTON
Third National Bank Bldg., H. B. Doty.

Oklahoma

OKLAHOMA CITY
Key Bldg., C. F. Aurand.
TULSA
Kennedy Bldg., A. E. Ballin.

Oregon

PORTLAND
Bedell Bldg., J. Fred Bergesch.

Pennsylvania

PHILADELPHIA
Broad St. Station Bldg., F. W. Slack.
PITTSBURGH
Fulton Bldg., C. F. Cruciger.

Tennessee

KNOXVILLE
Goode Bldg., Dyer Butterfield.
MEMPHIS
Sterrick Bldg., J. S. Bronson.
NASHVILLE
Stahlman Bldg., George S. Gillen.

Texas

DALLAS
Fidelity Bldg., J. B. Crockett.
EL PASO
El Paso National Bank Bldg., R. C. Stryker.
HOUSTON
Federal Reserve Bldg., G. L. Noble, Jr.
SAN ANTONIO
South Texas Bank Bldg., Carl L. Pool.

Utah

SALT LAKE CITY
Utah Oil Bldg., Ralph E. Bristol.

Virginia

RICHMOND
10 S. 5th St., F. P. Wilmer.

Washington

SEATTLE
960 Stuart Bldg., W. D. Shannon.

Wisconsin

MILWAUKEE
First Wisconsin National Bank Bldg., F. J. Tharinger.

OPA Price Ceilings

	Schedule Price No.	Date Effective
etic acid*	31	Sept. 29, 1941
etone*	36	Oct. 27, 1941
ohol, ethyl*	28	Sept. 15, 1941
" normal butyl*	37	Oct. 27, 1941
" wood*	34	Oct. 10, 1941
uminum scrap, secondary ingot*	2	Mar. 24, 1941
phalt and tar roofing materials	45	Dec. 12, 1941
ass mill scrap*	12	July 22, 1941
riap	18	Aug. 16, 1941
dmium	71	Jan. 19, 1942
stings, steel*	41	Nov. 15, 1941
al, anthracite (Revoked Sept. 18, 1941)	27	Sept. 12, 1941
al, bituminous (Revoked May 1, 1941)	5	April 3, 1941
ke, by-product foundry*	29	Oct. 1, 1941
pper*	15	Aug. 12, 1941
pper scrap*	20	Aug. 19, 1941
rums, used steel*	43	Dec. 1, 1941
rmaldehyde*	21	Aug. 20, 1941
ycerine*	38	Nov. 10, 1941
rdware, builders'*	40	Nov. 19, 1941
on and steel products*	6	April 17, 1941
on and steel products, resale*	49	Dec. 15, 1941
ad, primary	69	Jan. 15, 1942
ad scrap	70	Jan. 15, 1942
ather	61	Dec. 29, 1941
Machine tools, new	67	Jan. 22, 1942
Machine tools, second-hand*	1	Feb. 17, 1941
Magnesite	75	Jan. 28, 1942
Nickel, pure, scrap; monel metal scrap, stainless steel scrap, nickel steel scrap and other scrap materials containing nickel, secondary monel ingot, secondary monel shot, and secondary copper-nickel shot*	8	June 2, 1941
Oil, fuel	72	Jan. 9, 1942
Oil, Pennsylvania grade crude	22	Aug. 23, 1941
Paper board, sold east of the Rockies	32	Oct. 1, 1941
Paper, waste, sold east of the Rockies	30	Oct. 1, 1941
Pig iron*	10	June 24, 1941
Rail, relaying*	46	Dec. 2, 1941
Rubber, reclaimed	56	Dec. 20, 1941
Scrap, iron and steel	4	Aug. 3, 1941
Steel and iron products mill prices*	6	April 17, 1941
Steel and iron products, resale*	49	Dec. 15, 1941
Stoves; domestic, heating and cooking	64	Jan. 5, 1942
Tin, pig*	17	Aug. 16, 1941
Tires and tubes	63	Jan. 5, 1942
Tires; retreaded and recapped	66	Jan. 19, 1942
Wax, paraffin	42	Dec. 1, 1941
Zinc scrap and secondary slab*	3	Mar. 31, 1941

*Schedule prices published in Price Ceiling Guide in issue of Jan. 1, 1942.

Materials Division of War Production Board

New Social Security Building

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Iron and Steel Branch

• • • The reorganization of the war production agencies underway at the time this section went to press will undoubtedly cause some changes in the personnel of the various branches and divisions listed here. However, while the names of the branches and their relationships may be altered, it is likely that a majority of the personnel will continue to function in the same capacity as heretofore and under the same general titles.

Office of the Chief

C. E. Adams.....Branch Chief
Clark W. King.....Spec. Asst. to Chief
S. S. Lowe.....Spec. Asst. to Chief

Consultants to the Chief

Norman W. Foy.....Consultant
C. H. Longfield.....Consultant
David Austin .....Consultant
A. V. Wiebel.....Consultant
Joseph L. Block.....Consultant
J. V. Honeycutt.....Consultant
George C. Gries.....Consultant

Operations Section—Office of Branch Chief

Charles Halcomb .....Asst. Branch Chief
C. Sterry Long.....Spec. Asst.

Operations Section—Administrative Unit

G. C. Hinckley.....Administrative Asst.

Operations Section—Procedure Unit

Robert Houston .....Head of Unit

Review Unit

Patrick J. Treacy.....Indus. Specialist
F. C. Storrie.....Analyst

Special Industries Unit

R. W. Shannon.....Indus. Specialist
Frank A. Weidman.....Indus. Specialist
J. A. Ewing.....Analyst

Allocations Section

Stanley B. Adams.....Chief of Section
A. J. O'Leary.....Asst. to Chief
M. H. Hofmann.....Asst. to Chief
P. J. Sandmaier.....Indus. Specialist
Marshall Jones .....Indus. Specialist
H. Van Zandt.....Indus. Specialist
Maxwell F. Strunk.....Indus. Analyst
T. H. T. Brady.....Analyst

Lend-Lease Section

Paul F. Schucker.....Chief of Section
George V. Bolger .....Analyst

Specifications—Technical and Engineering Section

H. LeRoy Whitney.....Chief of Section
Ralph L. Wilson.....Indus. Specialist
E. D. Pratt.....Indus. Specialist
Edwin Joyce .....Indus. Specialist

Metallurgical Section

Dr. G. B. Waterhouse.....Chief of Section
Richard Doughton, Jr.....Analyst

Plant Expansion Section

W. A. Hauck.....Chief of Section
George E. Jurey.....Asst. to Chief
Frank H. Crockard.....Consultant

Expediting Unit

Harry W. Bryant.....Head of Unit
Leonard Rogers .....Consultant
H. L. Hewit.....Consultant

Statistical Unit

B. C. Moise.....Head of Unit

Consulting Unit

G. W. Vreeland.....
H. W. McQuaid.....
L. B. Lindemuth.....
H. W. Graham.....

Carbon Steel Section

Stanley B. Adams.....Chief

Ingots, Semi-Finished, Including Billets, Sheet Bars, Skelp; Rolled Shell Steel; Rails and Accessories Unit

A. A. Wagner.....Head
Ernest A. Wallace.....Indus.

Plates; Structural Shapes, Including Beams, Channels, Angles, Tees; Steel Piling Unit

Melvin W. Cole.....Head
John H. Overall .....Senior
William A. Roth.....
W. J. Banning.....
R. X. McGowan.....
Jay H. Kane.....
Baird C. Brookhart.....

Hot Rolled Bars, Reinforcing Bars, Etc., Unit

Albert C. Roeth, Jr.....Indus.
C. M. Woodworth.....
Fred E. Bynum.....

Steel Forgings and Castings; Plate, Rolled Steel Wheels and Axles, Forged Chain Unit

George Hocker .....Head
A. K. Reading.....
Robert H. Hoyt.....Indus.
Wm. H. Schoen, Jr.....Indus.

...ts, Strip and Tin Plate, Etc., Unit

...Miller.....Head of Unit
...Clark.....Indus. Specialist
...Kinkaid.....Indus. Specialist
...am A. Duckham.....Indus. Specialist
...E. Hursh.....Analyst
...rt H. Evans.....Analyst
...Steele.....Analyst

...d Drawn Bars, Cold Drawn Shell ...; Wire Rod and Wire Products Unit

...G. Hume.....Head of Unit
...y E. Hartman.....Indus. Specialist
...Sheers.....Indus. Specialist
...Downey, Jr.....Analyst

Steel Pipe Unit

...Lacy.....Indus. Specialist

Alloy Steel Section

...well Brace.....Chief of Section

Alloy Seamless Tubing, Alloy ...echanical and Boiler Tubing Unit

...Moorehead.....Head of Unit
...Buhler.....Indus. Specialist
...ert G. Croyle.....Analyst

...ainless, Valve Steel and Welding Rods Unit

...Coddington.....Head of Unit
...Greenamyer.....Analyst
...D. Matthews.....Indus. Specialist
...ard P. Hubbel.....Indus. Analyst

...High Speed Tool Steel and Bullet Core Steel Unit

...rvey McKenney.....Head of Unit

...oy Bearing, Shell Steel and Heat Treated Bar Unit

...H. Philpot
Asst. Sec. Chief and Head of Unit

Alloy Allocation Unit

...orge Mellon.....Head of Unit
...R. Worley.....Analyst

Warehouse Section

...R. Stuart.....Chief of Section
...D. Watson.....Indus. Specialist
...F. White.....Analyst
...F. Hitchiner.....Analyst
...E. Hulbert.....Analyst
...L. Merrick.....Analyst

Raw Materials Section

R. C. Allen, Deputy Chief and Head of Sec.
A. L. Fairley, Jr...Asst. Deputy Chief and Senior Indus. Spec.
T. W. Page.....Analyst

Pig Iron Unit

William Kerber.....Head of Unit
E. P. Buchanan.....Senior Analyst
Charles Fitzgerald.....Senior Analyst
Rhea B. Rutter.....Senior Analyst
T. L. Fossick.....Analyst

Scrap Unit

L. J. Borinstein.....Consultant
Alex Miller.....Consultant
Marvin Plant.....Consultant
W. H. Husted.....Consultant
F. E. Vigor.....Indus. Specialist
A. J. Borinstein.....Analyst

Fuel Unit

Edward Holley.....Consultant
Frank Chambers.....Indus. Specialist

Refractories and Fluxes Unit

Don Watkins.....Consultant

Blast Furnace Unit

S. O. Hobart.....Consultant
F. P. Brown.....Indus. Specialist

Iron Products Section

W. S. Shiffer.....Indus. Specialist

Priorities Section

E. B. Mason.....Senior Priorities Spec.
J. G. Bowen.....Priorities Specialist
C. R. Grabeel.....Priorities Specialist
N. F. Fuller.....Priorities Specialist
E. H. Campbell.....Priorities Specialist

Research and Statistics Section

George R. Kinzie.....Section Head
T. R. Smith.....Asso. Indus. Analyst
Adolph Appleman.....Asso. Indus. Analyst
Fred W. Harrison.....Asso. Indus. Analyst
Melvin J. Fox.....Asso. Indus. Analyst

Iron and Steel Section—Civilian Allocation

Eliot W. Gifford.....Chief
Alvin H. Berndt.....Indus. Specialist

Other Branches and Sections of Materials Division

Power Branch

(Power, gas, water supply, public sanitation)

J. A. Krug.....Chief

Cork and Asbestos Branch

F. W. Gardner.....Chief

Nickel Branch

(Nickel, monel, nickel alloys other than nickel steel)

Harry A. Rapelye.....Chief

Tungsten Branch

(Tungsten, molybdenum, vanadium cobalt, antimony, beryllium and ferroalloys of same)

H. K. Masters.....Chief

Copper-Zinc Branch

(Copper, brass and other copper alloys, zinc, cadmium)

D. A. Uebelacker.....Chief

Copper and Brass Section

Edgar H. Hammond.....Chief

Copper and Brass Mill Products and Brass Munitions Section

John W. Douglas.....Chief

Scrap Copper and Copper Alloy Section

Michael Schwarz.....Chief
Guy P. Norton.....Consultant

Copper Conservation Appeals Section

A. S. Hewitt.....Chief

Zinc Section

Myron Trilsch.....Chief

Cadmium Section

Harry J. Wolfe.....Chief

Manganese-Chrome Branch

(Manganese, chromium, silicon, zircon, columbium, tantalum, titanium, rutile, spiegeleisen and ferroalloys)

Andrew Leith .....Chief

Tin-Lead Branch

(Lead, tin, ilmenite pigment, antifriction bearing metals, solders)

Erwin Vogelsang .....Chief

Mica-Graphite Branch

(Mica, graphite, gypsum, magnesite, cryolite, fluorspar)

H. F. Wierum.....Chief

Miscellaneous Minerals Branch

(Mercury, industrial diamonds, quartz crystals, platinum group metals, radium, uranium, kyanite, abrasives, diamond dies, jewel bearings)

R. J. Lund.....Chief

Production Division of War Production Board

W. H. Harrison.....Director
H. G. Wilde.....Special Assistant
W. G. W. Glos.....Head Priority Specialist
Alfred Davis Charles.....Information

Shipbuilding Branch

Capt. J. O. Gawne.....Acting Captain

Construction Branch

W. H. Kahler.....Chief
D. Hays .....
B. D. Hull .....

Ordnance Branch

E. F. Johnson.....Chief
E. S. Chapman.....Small Arms Ammunition
L. E. Osborne.....Heavy Ordnance
L. deB. McGrady.....Explosives
W. W. Knight, Jr.....Tanks
C. G. Williamson....Production Scheduling

Aircraft Branch

M. C. Meigs.....Chief
Lt.-Col. E. M. Powers.....Engineering Unit
A. E. Lombard, Jr..Production Planning Unit
H. R. Boyer.....Manufacturing Unit
T. P. Wright, Chairman, Standardization Sub-Committee
A. E. Lombard, Chairman, Allocation Sub-Committee

Tools and Equipment Section

George C. Brainard.....Chief
A. M. Stedfast.....Machine Tools
C. A. Simmons.....Used Machine Tools
Roger Tewksbury.....Industrial Supplies
W. R. Bean.....Foundry Equipment
Bradley Stoughton..Heat-Treating Equipment
Sydney Buckley .....Cranes
A. M. Stedfast....Woodworking Machinery

Food Supply Branch

C. C. Townson.....Chief
John A. Martin....Chief, Perishable Food
Harry B. George, Jr...Non-Perishable Food

Textiles, Clothing, Leather Branch

R. R. Guthrie.....Chief
F. L. Walton.....Textiles and Fibers
Joseph Byron .....Hides, Leather and Skins
Robert J. Dillon.....Clothing

Health Supplies Branch

William M. Bristol, Jr.....Chief

Safety, Technical Equipment Branch

Oakley W. Dexter.....Chief

Container Branch

Walter Shorter .....Chief

Pulp and Paper Branch

Norbert A. McKenna.....Chief

Printing and Publishing Branch

George A. Renard.....Acting Chief

Lumber and Building Materials Branch

John L. Haynes.....Chief

Plumbing and Heating Branch

W. W. Timmis.....Chief

Automotive Branch

Ernest Kanzler .....

Farm Equipment and Transport Branch

Andrew Stevenson .....

Communications Branch

Leighton H. Peebles.....

Electrical Products and Consumer Durable Goods

Jesse L. Maury

Industrial and Office Machinery

Nathaniel G. Burleigh

Rubber and Rubber Products

Willard Helburn

State and Local Government Requirements

Maury Maverick

Production Requirements Branch

A. L. Williams.....Administrator

Inventory and Requisitioning Branch

E. A. Tupper.....Chief

Maintenance and Repair Branch

Jerome Low .....Chief

Housing Branch

Sullivan Jones .....Chief

Emergency Allocation Branch

R. S. Stevens.....Chief

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